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INSTITUTE OF ARCHITECTURE AND URBANISM
ARCHITECTURE DEPARTMENT



MASTER'S THESIS IN ARCHITECTURE AND HOUSING

**Theme: The urban added value of a peripheral
thermal complex. Case of Biskra (Algeria)**
**Project of revitalization of Hammam Salihin
Thermal Complex, Biskra**

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COMMITMENT TO HONOR

I with this affirm on my honor that the present master thesis is my personal work, that all the information and illustrations it contains, if they are not my own work, have been duly identified and referenced; and that this work has never been presented or discussed before; and that this commitment on my honor, which cannot benefit from prescription, engages my scientific integrity and my credibility as an academic

Blida in September, 30th 2021

KHELFANE Lyna, sign

PRESENTATION OF THE MASTER

1_ According to the higher education rules in Algeria, the objective of the master's degree is to "*develop in candidates, capacities for demonstration, scientific reasoning, synthesis, results from interpretation, and transcription of all the outputs in an exploitable form.*" Hence, the candidate has to demonstrate his reasoning, synthesizing, and restoring skills. This is valid for all knowledge fields.

2_ Moreover, teaching in Architecture & Urban Planning is essentially based on the workshop model. Thus, the candidate shall complete a Graduation project. To meet both general and particular requirements, the conduct of a Graduation project must be based on two complementary purposes. The first is to acquire the ability to carry out the project's conceptual process. It is necessary to synthesize all the inputs that refer to the use, the environmental dimension, culture, and mastering building construction. The second purpose tends to include the project in a theoretical theme related to architecture and the city.

3_ We recommend a global approach covering the entire master cursus (two years). It integrates all the master training skills. The program consists of a vertical workshop that promotes knowledge and skills. Indeed, this allows the student to grasp the complexity of the city issues before intervening through the project. On the other hand, we prevent choosing a new urban site every time since it requires more effort and time. This enables the master candidate to acquire comprehensive control of the project environment.

4_ The first-year program aims to learn how to design architectural projects. Therefore, it is crucial to involve the mechanisms of space production in the urban context and assimilate the fundamental concepts, methods, and knowledge. The candidate is prepared for the different professional fields and modes of professional practice by these requirements. This learning will be all the more successful if it considers the whole mechanisms related to the society, the territory, history, the current challenges, and the issues that engage the future for which the project is undertaken.

5_ In addition, it would be much more effective with an urban context where the entire workshop would work collectively to hold its complexity. This necessitates an interactive effort on the one hand and pooling the resources on the other hand. Hence, the pedagogical interest would be that the chosen urban context reflects the various concerns related to Algeria's urban space production and management.

6_ We intend to conduct the Master 1 program through lecture and urban analysis. The case study has to be pertinent regarding the related issues. We believe that the Saharan context would be particularly representative enough to offer the student the opportunity to seize them. In addition, we suggest going collectively and complementarily on two parallel situations so that comparative analysis could deepen the comprehension. We propose the cities of Biskra and Timimoun, respectively, in the Zyban and Gourara regions. Both cities raise multiple issues: significant historical changes, a particular relationship to the territory, a social structure pertinently affected by the changes, the challenge of Saharan urban design, and the effect of moving from the status of oasis to that of city-oasis.

7_ Comprehension thus enables the synthesis of both lecture and analysis. Then it concludes with a series of recommendations. These recommendations relate to various

situations: architecture projects, urban design, urban planning, heritage studies, academic search, and proposals to amend the legal texts. This effort is also reinforced through the contribution of local experts and officials. The candidates are therefore featured with factual and real development concerns. Along with this process, *the master-2 case studies are identified in fine.*

8_ The academic program of the master's degree (second year) follows in the same context. In addition, the Graduation project is supported by a search work that takes care of the academic aspects. Built-in this way, the candidate becomes aware of the challenges related to the territory and the environment. Then, both the manuscript and the Graduation project follow the same path and immerse each other.

9_ Nevertheless, the Covid confinement has caused the suspension of scholarship during the second part of the Master 1. The team working and the seminar debates did not be carried out slightly. So we had the duty to shorten the program. So we limited the case studies to a particular urban context in both cities. This had to remain the graduation projects representative of a real and relevant issue. This is how we have restricted the urban field to two urban site themes.

10_ In Biskra, Mohamed Seddik Benyahia Boulevard used to be the basic frame of the previous western ZHUN (new urban housing zone). It consists of a linear urban centrality within the west peripheral side of the city. After more than 40 years, the Boulevard seems overtaken by urban pressure. The local Direction of Urban Planning and Architecture (DUAC) recently undertook an urban project to improve the urban boulevard quality. In consultation with local experts, administrators and academics, we estimated that a socio-cultural revaluation would strengthen the Boulevard. It is around this theme that Biskra Graduation projects are developed.

11_ Timimoun is the Algerian land of choice for the worldwide intangible cultural heritage. It is distinguished by the Ahellil, the Sbouâ, the foggara water measurers, and most recently, the classification of Couscous as a Maghreb culinary heritage. The Sbouâ is the cultural heritage that mostly corresponds to a well-identified urban space. Every year the event occurs in various and successive processions. Nevertheless, the related areas remain in an elementary form that contrasts with the international audience it arouses. This is primarily the case of the last parade. On the other hand, the urban space faces increasingly an uncontrolled appropriation that threatens the integrity of the tangible property dimension. The transition from the status of Daïra (sub-region) to that of full-fledge Wilaya (region) will stress the phenomenon if no measures are taken.

Special note

Since we switched to the LMD system, this is one of the few times a candidate prepares his master thesis in English. That was the personal will of Miss Lyna Khelfane. At the beginning of the previous academic year, she asked whether it was possible. Ever since academic means universal, studies have to benefit from any language that could advance knowledge, especially English. So what was great our pleasure to respond: "Yes, you can do so!"

Beyond this particular aspect, the work seems to be not easy at all. Lyna has to learn more from English scientific literature, which is mainly available online, even though she will face particular concerns preparing and presenting all the dissertation contents in English. In Algeria, factual data and related written materials remain widely available in French and Arabic to a lesser extent. Thus, Miss Khelfane must spend additional time and effort to divert the various documents' data coherently to English.

Despite the imperfections accompanying the work, the achievement seems not familiar. However, as particular as it would be, this should not be seen as atypical or sensational. On the contrary, the initiative deserves attention and encouragement. Moreover, we witness increasingly more students dealing with English rather than French. Indeed we expect more enterprises to dare to prepare more master theses in English. This should be encouraged to occur more clearly in our institute. In this perspective, this act has to be appreciated at its actual value. That is why we insisted on including this particular note.

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This work would never have seen the light without the will of Allah, the greatest, who offered us health, force & strong will to get to the last step in our university career.

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I would also thank the juries for taking the time to honor us to examine this work; please accept my most profound respect.

I want to thank the teachers of the Department of Architecture, librarians, and administrators. To all those who have contributed to our training during our year of study.

To Mr. "Bentekkouka Amar" & Miss "Maria" for their time & patience with us. For those who have accompanied us, friends, loved ones, without forgetting our dear colleagues.

To my best friends "Nazim," "Naziha," "Saya," "Meriem," & "Haythem" for all their moral support, help & assistance.

To my dear aunts & uncles, my cousins "Assia," "Sihem," "Wahid," "Imen," "Djamel," & "Amine," for their help and support all along my university years.

Finally, we are grateful to our families, who have been a constant source of encouragement, support, and joy.

DEDICATION

Every challenging work needs self-efforts and the guidance of elders, especially those very close to our hearts.

First, I dedicate this humble work to my deceased grandmother, "Mouima Sadia," and my late grandfather "Djafar."

To my lovely parents; my mother "Fatma" and my father "Youcef" whose affection, love, encouragement, and prayers in days and nights make me able to get such success and honor,

My beautiful sisters "Yousra" who helped me a lot, "Maria" and my brother "Mohammed Rani,"

My dear English professor "Tewfik Mansouri," thanks to whom I'm the person I'm today.

Without forgetting my sweet friends and coworker who were there for me and for the love they shared with me, I love you all.

ABSTRACT

Thermalism uses the pressure of moving water of various temperatures to massage the muscles and stimulate circulation. The importance of water & thermalism was highlighted from the beginning of time. Many dynasties & Eras saw it as an essential part of life & health.

Algeria has significant potential in thermalism, owning over 202 thermal sources all over the country. After the independence, Algeria started developing its tourism, mainly the thermal tourism department, through data collection, rehabilitation & building of thermal stations. We can count around 25 stations in the Algerian oases.

Biskra is one of the many Wilayas to own thermal springs, meaning the presence of thermal stations. The stations were created close to the hot springs, at the city's periphery.

Today, most of these stations are losing their attractivity, sociability & connection to the people due to the urban growth & the city catching up to it, disturbing its initial harmony & logic.

The research aims to study this logic & try to locate the problem to adapt to its new position in the city by intervening in both the urban & architectural levels. We were able to reevaluate & restore the harmony of the thermal station resulting in gaining the connection to the Boulevard.

Keywords:

Health tourism; social attractivity; urban value, thermal complex, well-being.

RESUMEE

Le thermalisme utilise la pression de l'eau en mouvement de différentes températures pour masser les muscles et stimuler la circulation. L'importance de l'eau et du thermalisme a été soulignée dès le début des temps. De nombreuses dynasties et époques y voyaient une partie essentielle de la vie et de la santé.

L'Algérie dispose d'un potentiel thermique important, possédant plus de 202 sources thermiques dans tout le pays. Après l'indépendance, l'Algérie a commencé à développer son tourisme, principalement le département du tourisme thermique, via la collecte de données, la réhabilitation et la construction de stations thermales. On compte environ 25 stations dans les oasis algériennes.

Biskra est l'un des nombreuses Wilayas à posséder des sources thermales, ce qui signifie la présence de stations thermales. Les stations ont été créées près des sources thermales, à la périphérie de la ville. Aujourd'hui, la plupart de ces stations perdent leur attractivité, sociabilité & connexion avec les gens en raison de la croissance urbaine & la ville rattrapage, perturbant son harmonie initiale & logique.

La recherche vise à étudier cette logique et tenter de localiser le problème pour s'adapter à sa nouvelle position dans la ville en intervenant à la fois dans les niveaux urbain et architectural. Nous avons pu réévaluer et restaurer l'harmonie de la station thermique, ce qui nous a permis d'atteindre le Boulevard.

Mots clés : tourisme de santé; attractivité sociale; valeur urbaine, complexe thermique, bien-être.

المخلص

المعالجة بالمياه المعدنية تستخدم ضغط تحريك الماء من مختلف درجات الحرارة لتدليك العضلات وتحفيز الدوران. تم تسليط الضوء على أهمية المياه و المعالجة بالمياه المعدنية منذ بداية الزمن. العديد من العائلات و السلالات اعتبروها جزءاً أساسياً من الحياة والصحة..

وللجزائر إمكانات كبيرة في مجال المعالجة بالمياه المعدنية، حيث تمتلك أكثر من 202 عنصر معدني في جميع أنحاء البلد. بعد الاستقلال ، بدأت الجزائر تطوير سياحتها ، وبشكل رئيسي قسم السياحة المعدنية ، من خلال جمع البيانات وإعادة التأهيل وبناء المحطات المعدنية. يمكننا العد حوالي 25 محطة في الواحات الجزائرية..

بسكرة هي واحدة من الولايات التي نملك الينابيع الحاررية ، مما يعني وجود محطات معدنية. بنيت المحطات بالقرب من الينابيع الساخنة ، على أطراف المدينة. اليوم ، معظم هذه المحطات تفقد جاذبيتها ، قابليتها الاجتماعية وارتباطها مع الناس بسبب النمو الحضري و لحاق المدينة بها ، مما يبيد خلل في انسجامها ومنطقها الأولي..

يهدف البحث إلى دراسة هذا المنطق ومحاولة تحديد مكان المشكلة للتكيف مع موقعها الجديد في المدينة من خلال التدخل في كل من المستوى الحضري والمعماري. تمكنا من إعادة تقييم واستعادة انسجام المحطة الحاررية مما أدى إلى كسب الاتصال إلى الجادة.

الكلمات الرئيسية: السياحة الصحية ؛ والجاذبية الاجتماعية ؛ القيمة الحضرية ، والمجمع الحارري ، والرفاه.

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GENERAL INTRODUCTION

1. Introduction

Water as an essential element was known since the beginning of time; men built their cities near seas & rivers. Egyptians & Indians believed that it was the essence of life & humanity & Hindus used to dive their bodies in the Ganges river to heal their soul & body.

In Egyptian times, water was used for hygiene & beauty care; Egyptian women used water vapors for more beauty. Cleopatra used mud wraps from the dead sea to preserve her beauty. However, thermalism was mainly known through the Greeks.

They were among the first civilizations to understand the benefic properties of Sulphurous springs. Some famous Greek philosophers, such as Hippocrates, dedicated a section about thermal water in "De is, a quiz at loci." Thus, thermal springs were embedded in Greek culture and then set up both private & public baths all around the cities.

Although thermalism was born in Greece, it's only with Romans that it reached its golden age; it was considered a good health regimen. So first, various baths "Balnea" were constructed all over Rome & other conquered lands all over Europe & also in private houses, with a part dedicated to Sauna & massage. Then, it led to the emergence of majestic edifices "Thermae" with a capacity of hundred or thousand people. Thus, Roman baths were known all over Europe as an example of architecture. In addition, Roman "Thermae" had medicinal prominence & was used as a recuperation center for injured soldiers. Thermalism went from just a good health regimen to an experience of socializing, relaxation & working. New thermal centers SPA "Sanus per Aquam" were introduced & included gardens, shops & even libraries. In the middle age, the barbarian invasions & spread of Christianity; created a thermal crisis & the centers became desert. Baths were for cleaning & therapeutic purposes only; public baths were seen as a feature of "civilized life." It decreased with the decline of Roman's urban culture.¹



Figure 1 Roman thermae, Hammam Salhin Khenchla
Source: Discover Algeria

¹ Serena Gianfaldoni, Georgi Tchernev, Uwe Wollina, Maria Grazia Rocchia, Massimo Fioranelli, Roberto Gianfaldoni, and Torello Lotti, History of the baths & thermal medicine

After the fall of the Roman Empire & the rise of Christianity, baths became forbidden; it was believed that praying was more important than medicinal baths, people stopped bathing, some of them for years.²

In the 13th Century, baths slowly started to be re-used, particularly in Southern Europe under the influence of the Moors; many baths were built & access was usually free.

In the 16th Century, the popularity of thermal baths decreased; baths were considered a source of different diseases such as the plague & Syphilis. Baths became expensive & only available for the rich, who preferred baths from natural sources to public baths.

In the renaissance era, SPAs were reevaluated; scientists conducted new research & with the introduction of printing, they spread on a large scale. They became chosen for treatments & medical conditions.

Ottomans reintroduced baths as an everyday urban culture as a means of purification. Baths gained a central role were religious principles, combined with Roman bathing traditions leading to a boost of bath establishments; Numerous Hammams were founded in big cities such as Burda & Sofia and smaller cities.³



Figure 2 Ottoman Bath, Budapest

Source: <https://www.wherisyourtoothbrush.com/ottoman-budapest-thermal-baths/>

The medical thermalism was reinforced by the XVII & XIX century; doctors were persuaded that each disease had an appropriate medical spring. They developed combined treatments such as herbal baths, physical exercise, and diet. And extensive gorgeous gardens were built nearby the SPAs.

The belle epoque saw the arrival of "elitist thermalism" in Europe & the Americas, leading the SPAs to rise; Grand hotels, bars, restaurants & casinos & Thermal centers became part of the refinement life.

After the Second World War, thermal baths fell off again due to the mass destruction of the baths. The social form of hydrotherapy changed to become

² Serena Gianfaldoni, Georgi Tchernev, Uwe Wollina, Maria Grazia Roccia, Massimo Fioranelli, Roberto Gianfaldoni, and Torello Lotti, History of the baths & thermal medicine

³ THERMALISM IN GREECE: AN OLD CULTURAL HABITUS IN CRISIS, International Journal of Professional Business Review, vol. 3, no. 2, pp. 205-219, 2018, Universidade da Coruña

more open to the public & was included in the therapeutic program of the national health system.

By the beginning of the twenty-first Century, thermal baths regained importance as a preventive & therapeutic value.

The most important revolution in thermalism was that the concept of cure joined well-being with flourishing activities. SPA tourism is developing.⁴

Well-being is about experiencing positive emotions & how an individual is doing. It's a combination of physical, mental & emotional health & it's often linked to happiness⁵.

Countries differ in their levels of well-being. For example, higher economic development Societies have a lower rate of corruption & high levels of trust & are generally known for a higher level of well-being.

Health & well-being tourism keeps on growing & spreading worldwide, leading to new forms like thermal tourism. Health tourism consists of medical tourism, wellness tourism & SPA tourism; they are different but overlap. It's directed to people needing thermal treatment & also for those seeking illness prevention, physical & spiritual balance.

Well-being tourism dictates high-quality equipment & infrastructures dispensing an extensive range of services & activities, creating links to the territory & becoming a tremendous force shaping the regional development.

Health tourism is hard to associate with tourism statistics, making it tricky to measure growth importance & impact on the tourism industry & economy. People choose to travel for health care for several reasons: low cost & high-quality services, and unavailability of a particular treatment in their area. Health care providers & governments are catching up on the growth of this industry. Thermal stations started trying to modernize their image using the tourism card & offering more commodities.

One of the critical criteria of health tourism is sustainability & responsibility, relying on natural assets. It's crucial to have sustainable development, planning & management. These are the key fundamentals for a long-term health tourism industry.

Thermalism is one of the first forms of natural medicine exploited by man. Ever since old times, going to the Hammam has been a tradition.

Thermal complexes answer the needs of thermalism exploiting natural assets to satisfy the demands of the area. It's destined for curing several types of diseases using natural water.

They are usually installed in privileged areas, such as close to hot springs, pure air, and calm. Multiple types of complexes emerged with time; we can count national complexes, regional, & local. The capacity, services, and activities change according to the vocation.

⁴ Serena Gianfaldoni, Georgi Tchernev, Uwe Wollina, Maria Grazia Rocca, Massimo Fioranelli, Roberto Gianfaldoni, and Torello Lotti, History of the baths & thermal medicine

⁵ [Wellbeing - Better Health Channel](#)

National and regional complexes receive clients from far away, making it mandatory to provide all means of comfort: hotels, playgrounds, cinemas, shops, and restaurants.

These complexes are usually located on the outskirts of the city & are accessible by car mainly. The reason behind such decisions is to make sure the clients can make the best of their stay, enjoying the calm and breathing clean, pure air. Peripheral complexes integrate the immediate surroundings and are in harmony with nature, away from pollution, and in calm & clean areas.

Even though thermal complexes are mainly outside the city, some of them worldwide happen to be in the heart of it, or at least very close. They get to be of smaller surfaces yet closer to multiple other services and are primarily of local vocation.

One of the reasons behind it is that the hot springs or the water source may be close to town, so the center needs to be close to water.

Algeria is one of the biggest countries worldwide (10th in the world), with an essential geographic position, 1600km of coast, mountains (perfect for hiking and skiing), more than 200 thermal sources, and a prosperous cultural heritage. Despite its wealth in tourism, Algeria is ranked in the rear place in the African Mediterranean classification, with very modest results, but still developing. The tourism exploitation started right after independence and began collecting various information, leading to 174 tourist areas (ZET).⁶



Figure 3 Algiers, Algeria

Source: <https://www.flickr.com/photos/39997856@N03/8577111246/in/photolist-e4VWmo-rqGLq9-e2P1qz-rKBaq7-dRQBWn-qWRKmZ-8tgtGW-bSwWM6-cYVXHb-ddnNZH-rM9h6J-eGWBj1-dvKSE4-ha75Rn-e4FQKf-tDMJu-pBvG9A-cyLShU-ehR6T8-e3nkbk-bCYdi1-dkf3v6-ecHJGS-e>

The main focus was preserving our heritage by participating in "Euromed Heritage," which started in 1998, financed by the European Commission. The program tends to help the Mediterranean countries partner with the UN to enhance and preserve the heritage and promote cultural dialogue. Material & also immaterial heritage are taken into account according to their identity aspect & economic weight. The project provides technical assistance, improves cultural heritage knowledge, and helps to promote it; it also has awareness

⁶ HAMZA MEGHZILI, Modèles d'aménagement et d'urbanisation des Zones d'Expansion Touristique de la wilaya de Skikda (Algérie) p 112

programs and created a compendium of expertise, methodologies, and techniques. The program offers training related to heritage and cultural activities.⁷

Algeria also participated in the project "Archimède" in 2005; it's Euro-Mediterranean cooperation that aims to preserve and renovate seven Mediterranean cities. Its main actions are to identify architectural & urban heritage, along with creating urban projects (reorganization & recomposition). Each year, the country celebrates the international month of heritage, valorizing cultural and architectural heritage. Furthermore, the creation of entities in charge of the heritage's inventory, management, and valorization by applying adopted laws.⁸

Away from the protection & valorization of the heritage, Algeria worked on developing its tourism, mainly health tourism. Algerian government was trying to meet the considerations of both thermalism & tourism & finding a way to evolve the Algerian society after independence.

Being an enormous country with over 200 thermal sources, Algeria had excellent potential for thermalism.

Regardless of whether it's situated in the bottom of the mountain, in the middle of steppes, or at the gates of the desert, its charm is still breathtaking. Some stations provide medical care, making sure their times are memorable in a cocktail of water, health, and pleasure.

Algeria owns the most significant part of Sahara & a considerable number of oases. These oases were developed using three original irrigation methods; some used the Foggara, others used the depression excavated from the sand to get to the groundwater, where it's drowned up using camels or donkeys to irrigate their gardens. The third type relies on sharp curves in long underground rivers, creating a dam bringing water close to the surface.

With the world's fast development, the residents abandoned the traditional methods for modern pumps and spray irrigation systems.

In the Arid regions of Algerian Sahara, Oasis represents an originally manufactured ecosystem using natural resources. The Zyban region is one of the biggest oases in Algerian Sahara, with its strategic situation, extensive landscape & natural potential. The towns have an astonishing & beautiful architectural style.

⁷ [Le programme Euromed Héritage IV \(medmem.eu\)](http://medmem.eu)

⁸ [Mouvement associatif, projet «Archimed» : Une délégation bordelaise à Oran - Algérie360](#)



Figure 4 Ghoufi Balconies, Biskra
Source: Author

Algeria counts over 200 thermal springs, giving tourists the best opportunities to explore the vast desert, get medical care, and relax in the thermal complexes.⁹

Fast urbanization became a significant challenge for cities & natural spaces; according to the UN, it's expected to increase to two-thirds by 2050¹⁰. This rapid increase is catching up with the thermal complexes, changing the existing urban logic; most thermal complexes were located outside of the city, in nature, to find themselves caught up by the town, creating a big problem of enhancing their sociability in this new context. The complex sense goes from mainly mechanical to primarily pedestrian. Main entries used to be reserved exclusively for cars. Still, with the city catching up, it's time to rethink the main mechanical logic and adapt it to the new needs emerging with the change. In other words, introduce a new pedestrian logic, & give more consideration compared to the mechanical dimension, allowing the population to go into the complex without using a car. Thus, creating a new connection between the complex and the city and its people while keeping its natural aspect.

We need to control this chaotic growth and not let it disturb the harmony of the city by going from chaotic to planned healthy development by covering these new requirements to meet with the new vision emerging.

2. Problem

Several thermal complexes are developing around Biskra; we can count Hammam Salihin, Hammam Echifa, Hammam El Baraka & many others.

Hammam Salihin Thermal complex started as a peripheral complex. Still, it ended up in the city's heart due to the uncontrollable urban growth resulting in significant changes in the urban logic, forcing us to adapt the complex to the new town.

After a study & analysis of the Hammam and its surroundings, we notice its degraded state & the necessity to open the complex to town life. With this point made, we may ask:

⁹ S, Ouali, les sources thermals en Algérie Division Energie Solaire Thermique et Géothermie.

¹⁰ Exploring health tourism, European Travel Commission, UNWTO, p 10.

"How to contribute to revalorizing a thermal complex's structure & improving its social attractiveness?"

3. Questioning

To explore the central question deeply, we came up with a series of questions relevant to many aspects, such as general comprehension, history, legislation, economy, architecture, function & sustainability.

First, we need to understand the primary definition of a thermal complex as well as its types & how is it related to health tourism, therefore:

1. What is health tourism?
2. What is a thermal complex?
3. What types of thermal complexes are there in Biskra?

It's essential to take a historical approach to this subject, allowing us to interpret & analyze works & events of the past, & not judge them by their current standards only. As a result, we get a better understanding & appreciation of the narrative, therefore:

4. What's TC national policy?
5. The history of the thermal complex in Biskra?

The economic aspect is as important; it provides a valuable perception & awareness into how different societies interconnect & helps us meet the need of the population; it's a key to driving success, therefore:

6. What financial contribution has the HS TC for local development?

It's essential to understand the value of a Thermal peripheral complex & its social aspects & its vital role in the development :

7. What could be the added values in terms of urbanity?
8. How could the HSTC contribute to the social-cultural revalorization of the Boulevard?

Functional aspect helps amplify the focus on the needed activities & increase efficiency, resulting in a more clear vision, therefore:

9. Which activities can we add to the HSTC?
10. How can we make the complex smoother related to the flora (vegetal cover)?

An architect needs to take into consideration the sustainable & environmental aspects, being a key to a better future & an improvement of the quality of life by meeting our needs without compromising the future generations & maintaining the ecological balance, therefore :

11. How to adapt the HSTC for it to be Eco-friendly?

3. Hypothesis

To respond to the previous problem, we came up with the following hypothesis: **"The Thermal Complex could become more social by enhancing its activities & reinforcing its openness within the city."**

4. Methodology

The problem is fragmented into a series of questions that reach out to all aspects related to the theme. Every question must fulfill the five criteria: unity, feasibility, comprehensiveness, continuity, and increasing precision.

Unity requires clearly defining the research object & making sure the questions don't get out of context. Feasibility ensures that the questions are not just simple curiosity; the candidate must affirm that these questions are essential for his work. Comprehensiveness assures that the questions include all the aspects needed, guaranteeing to leave none behind. Continuity requires that the questions be ordered in a continuous logic, so it's easy to identify the relevant link between them. The increasing precision makes sure that the set of questions expresses a straightforward process & perspective.

Those questions fragment the problem and help indicate the action to carry out during the research (theoretical, analytic, and synthetic).

Theoretical actions are the bibliographical analysis, further research & interviews concerning introductive & theory aspects, state of the art, etc. The analytic actions are interpreted as case & situation analysis & field investigations; it shows the candidate's abilities to develop the objective sense of observation, fact analysis & critical sense in the understanding of phenomena or other researches. Finally, Synthetic actions are the terminal treatment where the candidate discusses the results & formulates conclusions. The main effort in this part is deduction efforts from the collected data with foresight of future possibilities.

Questions	Theoretical action	Analytic Action	Synthetic action
1. What is health tourism?	Th.a1		
2. What is a thermal complex?	Th.a2		
3. What types of thermal complexes are there in Biskra?	Th.a3	An.a3	
4. The history of the thermal complex in Biskra?	Th.a4	An.a4	
5. What's TC national policy?	Th.a5	An.a5	S.a5
6. What economic contribution has the HS TC for local development?		An.a6	S.a6
7. What could be the added values in terms of urbanity?	Th.a7	An.a7	S.a7
8. How could the HSTC contribute to the social-cultural revalorization of the Boulevard?		An.a8	S.a8

9.	Which activities can we add to the HSTC?		An.a9	S.a9
10.	How can we make the complex smoother related to the flora (vegetal cover)?	Th.a10	An.a10	S.a10
11.	How to adapt the HSTC for it to be Eco-friendly?	Th.a11	An.a11	S.a11

The defined actions are linked to causality and complementarity, allowing us to allocate them in time, possibly overlapping them. It concludes the final work plan.

Phases	W1	W2	W3	W4	W5	W6	W7	W8
Phase 1: Q1, Q2								
Phase 2								
Phase 3								
Phase 4								
Phase 5								
Phase 6								

To reply to these actions, we followed some operational methods:

The First step is data-collecting via bibliographical research (Books, articles, thesis, websites, pictures, and blueprints) to familiarize & clarify the concepts & provide support for further investigation.

The second step is an analysis of all the collected data, a complete analysis of Biskra in its different aspects & that including history, social, cultural, environmental, and urban.

The analysis helps better understand the town, its growth, & assets.

The third step was organizing field trips. Two field trips were conducted to Biskra during the two years of the academic master; the First trip was to acquire first impressions of the town and its particular situation & historical development; we conducted interviews with the local communities & responsible for Biskra.

The second trip was to deepen our knowledge & understanding of the town, to make site surveys for the master's project and to analyze its immediate environment, and answer the questions concerning our thesis; we had interviews with the people related to our research (Director of Hamman Salihin, EGT Biskra, and DUAC)

The Fourth step was looking for similar examples to our project, analyzing them & making a comparison to draw a conclusion helping us with the project's conception.

5. Structure of the thesis

The manuscript is divided into three chapters. The first chapter is the general introduction, which includes general ideas about the theme, main question & the methodology used to answer the problem and confirm the hypothesis. The second chapter consists of the thematic research and example analysis. The third chapter contains the presentation of the town of Biskra, a site analysis until we get the architectural part.

6. Circumstances

The research work was limited due to the Covid-19 situation making it hard to travel & get all the data needed. The field trips were reduced to two trips instead of three, & the quarantine limited our accessibility to people & data, making it hard to get an answer for all the questions. The absence of much local research on the subject & the limited resources, especially in English, was an obstacle we had to overcome.

CHAPTER II: THERMAL TOURISM

1. Introduction

This chapter will introduce the concepts of tourism & thermalism through general definitions & types. Besides, we will present the socio-cultural aspects & activities that are needed. It's also fundamental to mention sustainable architecture & its elements. An Example analysis will be concluded to ease understanding a thermal complex.

2. Tourism

Tourism involves the movement of people to other countries or places away from their usual territory. They are called visitors if the trip does not require an overnight stay & a tourist if it does¹¹.

There are many definitions from different experts:

According to the World tourism organization¹², tourism is a social, cultural, and economic phenomenon that entails people's movement to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (either tourists or excursionists; residents or non-residents), and tourism has to do with their activities, some of which involve tourism expenditure.

According to the Oxford dictionary¹³, tourism is a business activity that provides accommodation, services, and entertainment for people visiting a place for pleasure.

According to Hunziker & Krapf (1942), Tourism is the sum of the phenomena and relationships arising from the travel and stay of non-residents. They do not lead to permanent residence and are not connected with any earning activity.

Mathieson and Wall (1982) also say that tourism is the temporary movement of people to destinations outside their usual places of work and residence, the activities undertaken during their stay in those destinations, and the facilities created to cater to their needs.

Based on the definitions above, we conclude that tourism is about travel, relaxation, and entertainment.

1.1 History of tourism

In the past, travel for tourism purposes was reserved only for royalty & higher classes. Tourism developed from being exclusively royal to something enjoyed by many.

Some of the main periods that marked the origins of tourism:

¹¹ [Introduction to tourism | VisitBritain](#)

¹² [Glossary of tourism terms | UNWTO](#)

¹³ [tourism noun - Definition, pictures, pronunciation and usage notes | Oxford Advanced Learner's Dictionary at OxfordLearnersDictionaries.com](#)

Greek period

Greeks traveled to Delphi to question the Oracles or for the Pythian game & Olympic Games. Herodot (485-424 BC), a Writer interested in history & ethnology, developed a new type of research trip in his visits to Egypt, North Africa, the Black Sea, and many others.¹⁴



Figure 5 Egyptian Pyramids

Source: <https://www.futura-sciences.com/sciences/questions-reponses/archeologie-ont-ete-construites-pyramides-egypte-5199/>

Roman Empire

The Roman Empire gave tourism great importance due to the development of its infrastructures. In the first Century after Jesus, a touristic economy organized travels and provided information & accommodation. The wealthy Romans sought relaxation in seaside resorts or by the beach in Egypt & Greece. They developed a "summer health retreat" in thermal baths and luxury locations mainly frequented by rich people. What originated to be primary health care grew to become holidays destined for pleasure.

The fall of the Roman Empire resulted in the deterioration of the roads making travel difficult & very dangerous.



Figure 6 Roman ruins, Typaza

Source: Author

Medieval

Medieval society defined their travel; journeys to famous educational institutions (France, Italy, and England) became a tradition. The desire to experience the world as an individual became a means to self-comfort & achievement of self-realization.

¹⁴ [The History of Tourism: Structures on the Path to Modernity — EGO \(ieg-ego.eu\)](http://www.ieg-ego.eu)

16t-18th Century

Travel became a mandatory element of training & had a highly disciplined set of codes. The primary purpose was to mature & learn through traveling & return as an accomplished man.

Grand tours attempted by young nobles described modern tourism; these trips were structured as the end of childhood & to acquire social grace, which with time had increased the importance of leisure & pleasure among these trips. The noble political, social & professional concerns defined their destination.

Enlightenment- 19th Century

Educational journeys by the upper-middle-class had an essential impact on tourism development. Poets & Philosophers like Jean-Jacques Rousseau (1712-1778), Charles Baron de Montesquieu (1689-1781), and many others searching for knowledge. People explored the countryside, cities, & landmarks to experience nature & deepen their understanding of themselves.¹⁵

XX Century

Political & economic environments changed, resulting in the disappearance of aristocratic tourism. Tourism started to become accessible to all. Paid holidays were installed (1936) & vacancy clubs were realized¹⁶.



Figure 7 CET complex, typaza
Source: Author

1.2 Role of tourism

Tourism is an essential branch for countries development through its several roles as:

Social

Socially, tourism enhances the communication between different individuals; it allows them to get away from their usual environment & change their social institutions

¹⁵ Ueli Gyr, The History of Tourism: Structures on the Path to Modernity, 2010

¹⁶ ADEL Nihad. BEKHOUCHE Amira, introduction du confort thermique dans un complexe thermal dans la région de Mila, 2016

Political

Tourism allows countries to be more open to the world & create a business movement between them, & also raise international awareness.

Economic

Tourism favors commercial exchanges & increases the monetary exchange resulting in a balance in the commercial scales.

Cultural

Discovery of new destinations, historical sites & cultures through cross-cultural exchange¹⁷.

1.3 Types of tourism

Pleasure tourism

Pleasure tourism is about people going on vacation, having some fresh air, relaxing, & enjoying the beauty of the region, Such as Parks and mountains.



Figure 8 Saone Valley residential Park

Source: https://www.tripadvisor.fr/LocationPhotoDirectLink-g4505201-d4495070-i151416247-Saone_Valley-Traves_Haute_Saone_Bourgogne_Franche_Comte.html

Sport tourism

- ✓ Significant sports events like the Olympiad Games, World Football Cup, World boxing Championship & other essential events attract visitors from all over the world.
- ✓ Sporting tourism for people willing to learn and practice by themselves includes horse riding, hunting, climbing¹⁸.

Cultural tourism

Any relaxation activity that the primary motivation is looking for knowledge & emotions by discovering architectural heritage such as cities, villages, archeological sites, religious or intangible buildings like traditional festivals, and national/local customs.

¹⁷ ADEL Nihad. BEKHOUCHE Amira, introduction du confort thermique dans un complexe thermal dans la région de Mila, 2016

¹⁸ <http://eprints.polsri.ac.id/2283/3/CHAPTER%2BII.pdf>



Figure 9 Festival in Timimoun
Source: Author

Business tourism

Any temporary stay of a person outside of their house carried out mainly during the week & motivated by Business reasons.



Figure 10 Hilton Hotel, Algiers
Source: https://www.alibabuy.com/hotel/algerie/alger/hilton_alger-ali147215.htm

Saharan tourism

Any touristic stay in the Saharan region is based on explaining the different historical, cultural & natural potential, with recreational and discovery activities of this environment.¹⁹



Figure 11 Tinerkouk, Timimoun
Source: Author

¹⁹ Official Journal N°11 of the 18 Dou El Hidja 1423 / February 19th, 2003

Seaside tourism

Tourists stay at the seaside; they also have marine-related animation, adding to the leisure activities.

Health tourism

Dr. Tomislav Mestrovic defines it as the process of traveling outside of the country of residence to receive medical care.

It can also be defined as Traveling to receive medical treatment in specialized institutions.

Health tourism can be divided into two types :

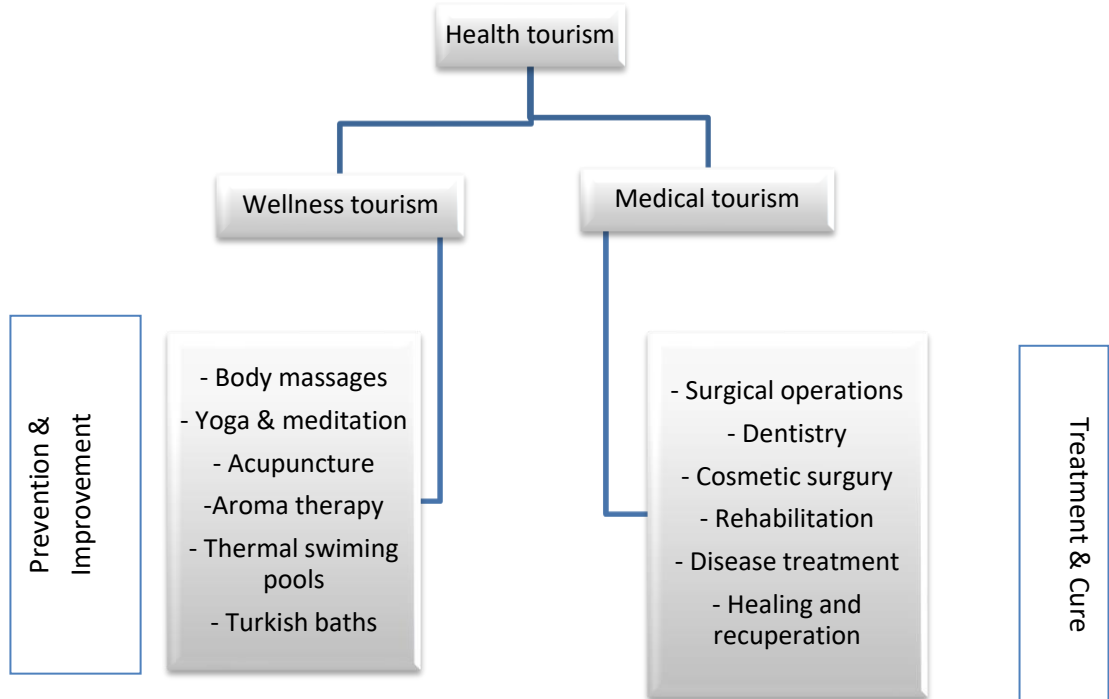


Figure 12 The health tourism system.

Source: Victor Gomez Rodriguez, Perspectives for medical tourism development in Portugal's central region in light of health care. p03

Thermal & thalassotherapy tourism

Any travel to get natural water-based treatments from thermal springs of high therapeutic value or seawater.²⁰



Figure 13 Thermes of Bath, UK
Source: Diego Delso (via Wikipedia)

²⁰ Official Journal N°11 of the 18 Dou El Hidja 1423 / February 19th, 2003

1.4 History of health tourism

The Romans built several therms, baths, & resorts with enormous capacities in the Roman Empire. These resorts were more than just health regiments; they developed to become also for socializing & relaxing. Greeks used to go to Epiduria to visit Asklepios (God of healing), revealing remedies in their dreams. Between the 15th & 17th centuries, the rich grew interested in medicinal SPAs, mineral springs & the seaside due to the poor sanitary conditions. These individuals would also travel to known medical schools for medical assistance.

In the 18th & 19th centuries, SPA towns became very popular for health cures, especially in the South of France, where they would escape the cold climate of northern Europe. The changes experienced in industrialization wound up the unsanitary conditions growing concerned for health development. The emergence of railways helped enhance the flow of people going to seaside & coast side resorts allowing them to practice what was viewed as a healthy pastime; it was more than just "taking the water" as a fashionable & sociable activity.

Health tourism continued to grow into the 20th Century, springs, resorts & SPAs kept being reviewed as therapeutic through exposure to the sun, fresh air & water. In the present day, countless health resorts exist around the world.²¹

1.5 Tourism policy in Algeria

After the independence, the Algerian government needed to prove & affirm its existence by making quality tourism plans & opening opportunities for foreign investors, answering international & especially national needs of tourism, health & well-being.

From a health tourism point of view, the government mainly focused on SPA tourism; the area is well developed & has big potential thanks to its abundance in hot springs. Currently, there are eight government-run facilities in agreement with local health insurance providers allowing good health care for their clients, plus 13 privately run spa resorts. In 2017, 70 hot springs were granted to private investors to be evolved into spa resorts. The total resorts attract over 300,000 patients per year.

Having an essential geographical position & a prosperous cultural heritage, Algeria had considerable potential in tourism. From 2014 Algeria counts around 205 Tourist areas (ZET) created by the 60s occupying an area of 53.000 Ha & allocated as follows:

- ✓ 155 Seaside ZET
- ✓ 30 Saharan ZET
- ✓ 11 Climatic ZET
- ✓ 9 Thermal ZET²²

²¹ <https://eprints.qut.edu.au/16804/1/c16804.pdf>

²² HAMZA MEGHZILI, Modèles d'aménagement et d'urbanisation des Zones d'Expansion Touristique de la wilaya de Skikda (Algérie) p 112



Figure 14 Touristic complex CET, Typaza
Source: Author

2 Thermalism

Thermalism can be defined as using the pressure of moving water of various temperatures to massage the muscles and stimulate circulation.²³

Thermalism refers to all activities related to using and exploiting thermal waters. This applies to all matters on spas and thermal cures, which are the strictly medical aspect of thermalism, taken over by the specialty of thermal medicine, exercised by thermal doctors.

2.1 History of thermalism

Greek period

Ancient Greece was significantly influenced by hot springs. Bathing was considered as more than a simple cleansing measure. Cities had paid private & public baths; they consisted of an area allocated for hot baths and another chamber for unction & massage.

The baths were mainly built with mud bricks and slightly used baked bricks, limestone, & stucco. The floor plans were simple & functional: rectangular or irregularly shaped sections assembled around circular chambers. The dome represented the characteristic architectural element of Ancient Greek baths.²⁴

²³ [Thermalism - definition of thermalism by The Free Dictionary](#)

²⁴ [ORIGIN OF SPA | Thermal springs in Europe \(wordpress.com\)](#)

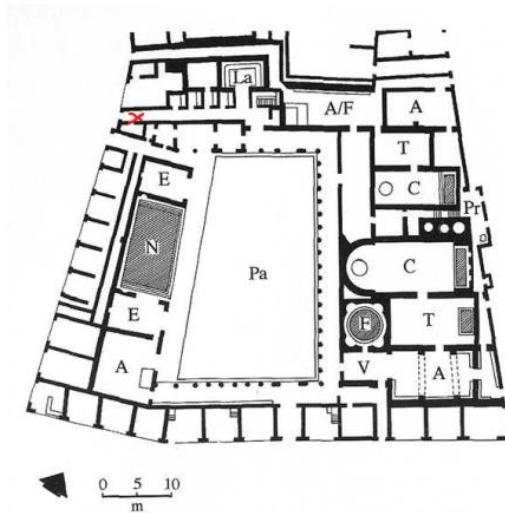


Figure 15 Plan of Stabian Baths, Pompeii
Source: [Oxford Classical Dictionary \(oxfordre.com\)](http://oxfordre.com)

Roman Empire

The Roman expanded the Greek bathing practices throughout the continents. The thermal baths were embraced as a regular health regiment, as recovery centers for wounded soldiers and therapeutic ones for healthy soldiers.

There were three types of baths in Ancient Rome: home baths "Balnea," "Balnea Privata" private baths, & public baths "Balnea Publica," the state ran them. The concept "Balnea Publica" resulted in outstanding edifices called "Thermae," elaborated aqueduct systems transporting water to the public bath areas, steam room & private stone tubs.²⁵

Despite the various sizes & complexity of Roman baths, they still served one bathing ritual: walking through numerous rooms with increasing temperatures ending with a cold plunge.

The baths contained "Apodyterium," the changing room, "Frigidarium" cold room, "Tepidarium" warm room, "Caldarium" the hot room, along with the "Natatio," an open pool for swimming.

Several baths, spas, & resorts were destroyed after the fall of the Roman Empire.



Figure 16 West roman baths, chercell
Source: Author

²⁵ [ORIGIN OF SPA | Thermal springs in Europe \(wordpress.com\)](http://wordpress.com)

Ottoman/Islamic baths

When the Ottomans Confronted the Romans' bathing habits, they decided to merge them with their own, creating a whole new cleansing ritual.

The Ottoman baths consist of three linked rooms, "Camekan" which is a splendid entrance hall with a reception & a locker area where they receive the bath items than being escorted the main room "Sicaklik," it has a large marble block, either octagonal or rectangular, called "göbek taşı" or belly stone in the middle and fountains in the corners. The most noticeable is the dome-shaped roof ornamented with circles or star-shaped windows passing natural light. The last room is "Soğukluk," the recovery area; it's a modern-day tea lounge to help clients relax after their bath.



Figure 17 OttomanIslamic Baths

Source: <https://theegeeye.com/turkish-baths-a-source-of-healing/>

Modern tourism

After WWII, thermal baths were reduced to ruins & their popularity dropped. A radical change in the ways of bathing occurred due to scientific progress & new research

In the 21st Century, baths reclaimed their importance for having preventive, rehabilitative & therapeutic purposes. New innovative architectural projects have seen the light, such as Aix-les Bains, France.



Figure 18 Aix-les-Bains Thermal Baths

Source : [Chevalley Thermal Baths in Aix-les-Bains - French Alps - Savoie Mont Blanc \(savoie-mont-blanc.com\)](http://Chevalley%20Thermal%20Baths%20in%20Aix-les-Bains%20-%20French%20Alps%20-%20Savoie%20Mont%20Blanc%20(savoie-mont-blanc.com))

2.2 Thermalism in Algeria

When it comes to thermalism, Algeria implanted modern establishments by natural hot springs & water sources. The Policy in Algeria is as follows:

Separation

The main clients are Algerians, making it required to separate the two sexes by dividing the establishment into Man Areas & Woman areas.

Differentiation

We can count two types of clients in the Algerian thermal stations: people passing by and looking for rest & relaxation and others seeking medical help. Thus it's essential to provide the right equipment & activities to satisfy their needs.



Figure 19 Women entry, Hammam Salihin, Biskra
Source: Author

2.3 Thermal establishments

By definition, every establishment uses thermal waters & hot springs for therapeutic & wellness purposes. They are usually installed in privileged areas with clean & pure air, calm, mostly in nature, allowing clients to get away from their routine, change up, relax & get medical treatment if needed.

We can divide thermal establishments into three types:

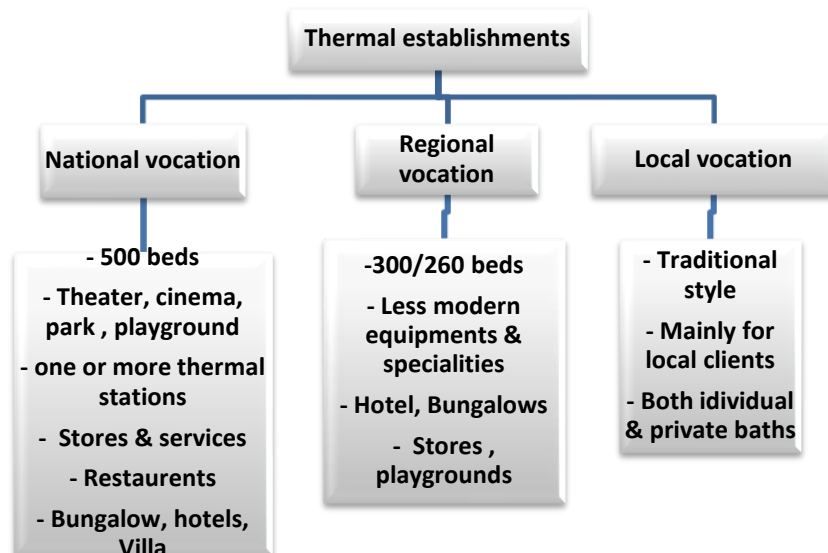


Diagram 02: Types of thermal establishments

Source : Boudjellal Rokia Chekhab Fatma, Le confort thermique dans une station thermal « le cas de hammam Chellala » a Guelma, p 11

2.4 Algerian thermal potential

Algeria has a strong potential when it comes to thermalism; Algerian territory owns over 202 thermal sources, from which we can mention:

1. Hammam Chellala
2. Hammam Salihin kenchela
3. Hammam Guergour
4. Hammam Salihin Biskra
5. Hammam Soukhna
6. Hammam zelfana
7. Hammam Melouane
8. Hammam Righa
9. Hammam Bouhnaifia
10. Hammam Rabbi
11. Hammam Ain Ourka
12. Hammam Bouhdjar²⁶

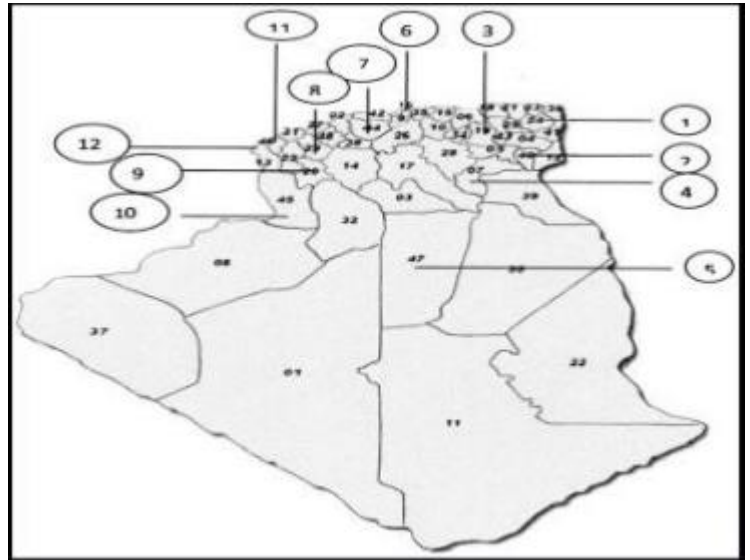


Figure 20 Map of the thermal sources in Algeria
 Source: GUESSOUM FELAH. -GHALMI SIFEDDINE, LA VALORISATION DU TOURISME DE SANTE A TRAVERS UN COMPLEXE THERMAL HAMMAM AMAMRA CAS D'ETUDE KHENCHELA, p 21

Thermal presence isn't restricted to the North only; every time there was a possibility of a hot spring, the Algerian government created a station close to it, whether, in the Tell, high lands, or Sahara, thermal stations are present.

²⁶ GUESSOUM FELAH. -GHALMI SIFEDDINE, LA VALORISATION DU TOURISME DE SANTE A TRAVERS UN COMPLEXE THERMAL HAMMAM AMAMRA CAS D'ETUDE KHENCHELA, p 21

3 Sustainable architecture

Sustainability is the development that meets the needs of the present without compromising the ability of future generations. The sustainable architecture reflects in the building material, manufacturing methods, resource use, & design. It must smooth sustainable operations during its life cycle. Sustainable architecture should be functional & aesthetically superior, constructed with a mindset of accomplishing long-term energy & resource efficiency.

Sustainable architecture is also known as **Green architecture** or **Environmental architecture**. Architects would produce intelligent designs with minimal harmful effects on the ecosystem & the community.

“Buildings and construction account for more than 35% of global final energy use and nearly 40% of energy-related CO2 emissions²⁷.”

Urban growth impacts the environment hugely. Providing habitat to the community takes an enormous amount of natural resources. A balance must be made between the form, function & interactions with the surrounding environment to be considered sustainable development.

implementing sustainable architecture in old or new buildings have social, environmental & economic benefits :

Social

Makes sure to improve the standards of living & level of comfort, all while enhancing the atmosphere & nature simultaneously. The implementation of sustainable development allows reducing the demand for utility infrastructures.

Economic

Minimizes the long-term costs, facilitating the resident’s efficiency, & enhancing the assets & property value.

Environmental

Works on protecting the ecosystem, enhancing biodiversity, & conservation of natural resources. Also diminution of the energy consumption & waste.²⁸

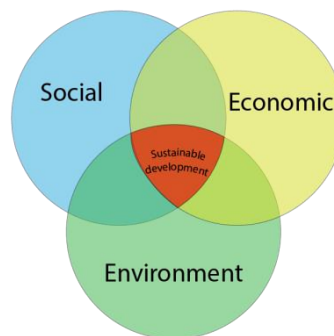


Figure 21 Pillars of sustainable development,
Source: Author

²⁷ UN Environment, [Global Status Report 2017](#)

²⁸ [What is Sustainable Architecture - Barker Associates \(barker-associates.co.uk\)](#)

4 Example analysis

Analysis means breaking down a subject's diverse elements then asking questions such as why & how to get a conclusion of our own. Example analysis comes to respond to the necessity of information. To prepare a project, we need to analyze similar others to get to know them better, making it easier to understand the upcoming project.

4.1 Hammam Chellala



Figure 22 Hammam Chellala

Source: <https://www.facebook.com/complexechellala/photos/a.164204180292679/2187820764597667/>

Justification

the Hammam was chosen due to its peripheral situation relative to the town and to have a better understanding of its functioning & get a hold of the logic of the space.

Presentation of the establishment

The Hammam was built over an old Roman Thermal Station, inaugurated by 1976; the complex was known for its phenomenal views and having the hottest water in the world after the GEYSERS in Ireland with a temperature that can get up to 96 °C with exceptional therapeutic properties.

The station was built to be in harmony with the nature surrounding it & was a mix of contemporary & Moorish (Moresque) styles.

Situation

Hammam chellala is situated 20 Km North-west from the Wilaya of Guelma at the periphery of the village, at a 320 m altitude on the Oued Bouhamdane valley.

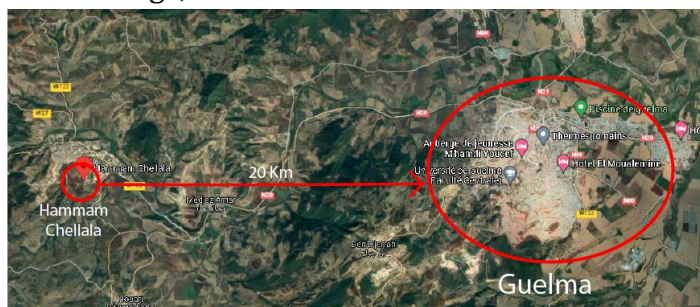


Figure 23 Situation of the Hammam
Source: Google maps, edited by Author

Implantation

the total area of the Hammam is around 22 Ha, but only 9% is built and 64% landscaped.

It's strategically located, elevated compared to the village, allowing a marvelous panoramic view and highlighting its natural resources & biodiversity.

The station came as an answer to people's needs for thermalism & tourism.



Figure 24 View of hammam Chellala

Source: <https://www.liberte-algerie.com/est/afflux-des-curistes-a-hammam-debagh-244929>

Accessibility

The Hammam has one main access logic, a mechanic logic. Two main roads to access it: a derived from National road N°20 on the East & the Wilaya road N°122 on the North allowing direct access without entering the village.

Pedestrian paths are designed inside the complex & can access every block. The hierarchy of the paths results in better management of the circulation.



Figure 25 Accessibility of the Hammam

Source: Google maps



Figure 26 Pedestrian path

Source : Boudjellal Rokia, Chekhab Fatma, Le confort thermique dans une station thermal « le cas de hammam Chellala » a Guelma

Space organization

we can notice two principles :

Semi-exploded: a compilation of unitary blocs for the hotel & thermes & exploded for the Bungalows.

Centralization: Different complex parts are organized around commerce & leisure equipment.

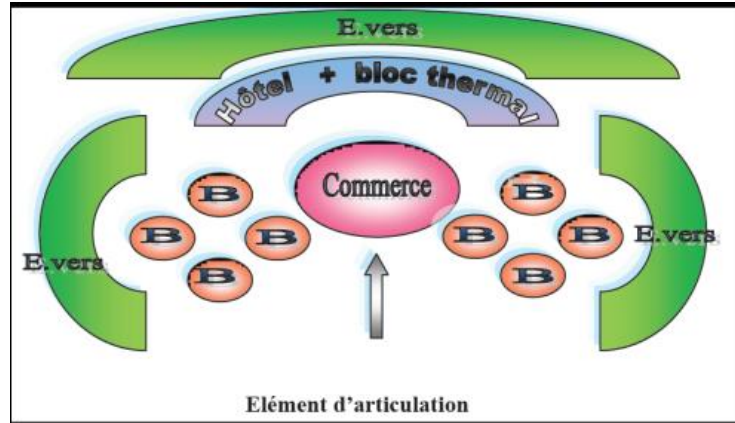


Figure 27 Organization principle

Source : ADEL Nihad, BEKHOUCHE Amira introduction du confort thermique dans un complexe thermal dans la région de Mila

Outputs

The station is implanted in a natural environment with marvelous panoramic views & owns a large non-exploit perfect for future extensions, the access to the Hammam is direct & easy. Despite the surrounding environment, the station remains peripheral & relatively isolated; the misplaced structures resulted in obstacles for light & ventilation. We need to reconsider the concrete taking over the green spaces & make place for more kids playgrounds.

4.2 Caldea Thermal Station



Figure 28 Caldea Thermal Station

Justification

The thermal station is situated in midtown, which would help study its relationship with the city & its openness to the people.

Presentation of the station

In 1987, the Escaldes Engordany City council decided to exploit the hot spring in the area & launched the project Cladea, inaugurated on March 24th, 1994. The station was set in a charming mountain environment creating a set of experiences suitable for all audiences & allowing visitors to experience this natural resource and an adventure with a particular & original philosophy diverging from the traditional concept of spa centers

Situation

Caldea Thermal center is situated at 1024 m of altitude, in Escaldes Engordany, in the heart of Andorra, and extended over a total area of 44.849 m².

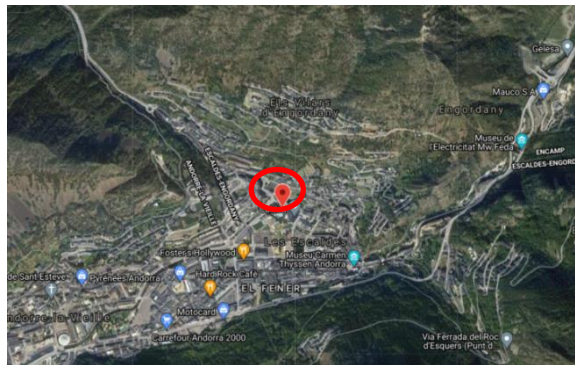


Figure 29 Situation of Caldea

Source: <https://www.caldea.com/en/how-to-get-there>

Accessibility

The station owns two types of entries:

Mechanic: from the “Coprincep François Mitterrand” street

Pedestrian: there are two pedestrian entries; the main one is on the “parc de Mola” via the stairs overlooking the entrance directly on the first floor. The secondary access is on “Josep Viladomat.”



Figure 31 Mechanical entry
Source: Google Maps "street view."



Figure 30 Main Pedestrian entry
Source: Google Maps "street view"

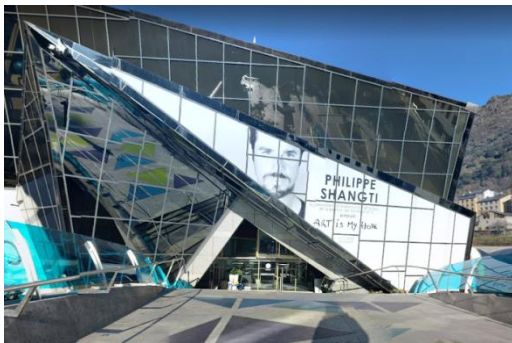


Figure 32 Main Pedestrian entry
Source: Google Maps "street view."

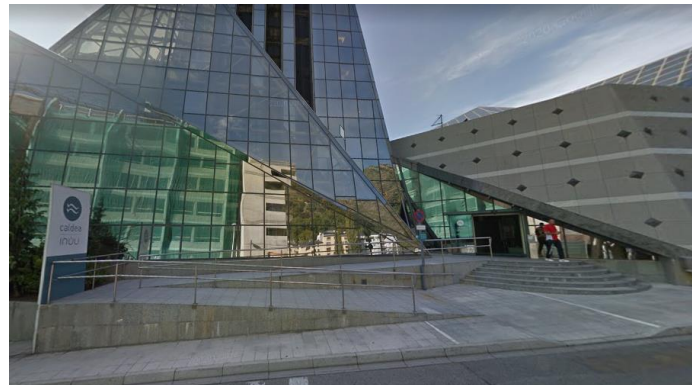


Figure 33 Secondary pedestrian entry from "Carrer Josep Viladomat"
Source: Google Maps "street view"

Space & architecture

The French architect Jean Michel Ruols presented Caldea with a unique image with mineral & crystal references, dominated by straight & vertical lines beside dynamic shapes inspired by the mountainous environment of Andorra. Caldea originated as a stone & wood construction inspired by Romanesque Churches to become an avant-garde building eventually.

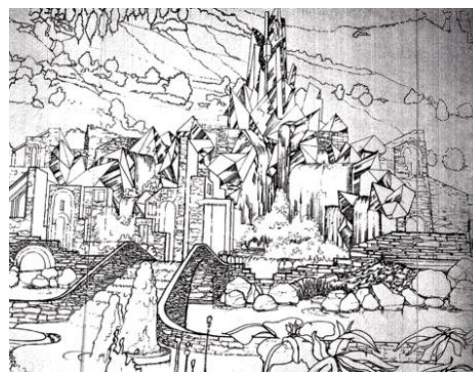


Figure 34 Architectural draft
Source:
<https://www.caldea.com/en/history>

Views

Caldea owns marvelous panoramic views:



Figure 35 Views of Caldea
Source: www.Caldea.com

Facade

The facade is covered by semi-emitting glass attenuating the greenhouse effect, symbolizing the transparency of the water, and follows the winding profile of the mountains,
“Designed as a mirror, CALDEA reflects the time, the village, and the mountains while blending into the environment.”

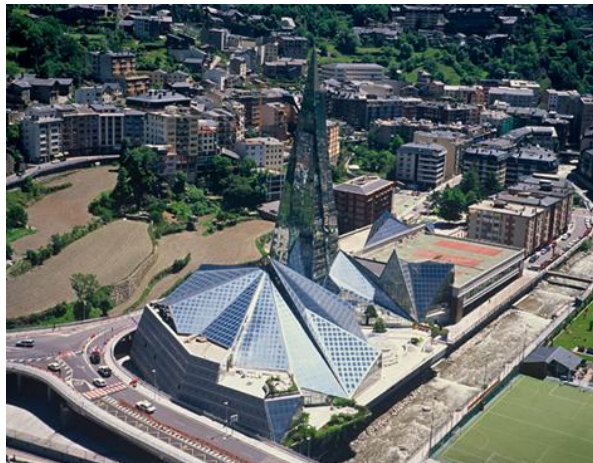


Figure 36 Caldea seen From a drone
Source: <https://www.caldea.com/en/history>

Outputs

The Caldea thermal station has a central organization with a monobloc volume. Its activities include two types of water use: medical use & water parks. Its midtown situation & architecture makes it recognizable from far away & attracts a lot of people, and it gives magnificent views on both the town & the mountains besides.

Conclusion

Thermalism is one of the contributing factors to local development & the growth of attractivity in a town. Algeria is no exception, existing since the beginning of time yet suffered of a big deterioration with time.

The emplacement & access of an establishment is important into pushing people to join & try, the more accessible the more attraction. The main aspect that should be highlighted is the needs of the people, which need to be reviewed, studied & put into an action plan. By improving its functional aspects, & an enhance of activities, it is possible to restore the long lost attractivity of the complex.

CHAPTER II: ARCHITECTURAL PROJECT

1 Presentation of Biskra

Biskra is the Queen of the Zyban; Biskra owns its name from the sweetness of its dates. The origin of the Name “Biskra, Sokkra, Vesca” is explained differently. “Vesca” is a Roman word for “Station” or “location” for commercial exchange. It is related to its geographical position as a junction between North & South Algeria.

2 Geographical situation

Biskra is situated 470 Km South-east of Algiers, the county town of the wilaya with an area of 21 571 km² & a population of around 600 000 inhabitants. Biskra is at 34,48° latitude North & longitude of 5,73° East & an 87m altitude.



Figure 37 Geographical situation of Biskra

Source : (a) et (b), Situation géographique de la ville de Biskra; (c) carte de... | Download Scientific Diagram (researchgate.net)

Biskra is limited by:

- ✓ North by Branis
- ✓ South by l’Omach
- ✓ East by Chetma
- ✓ West by El Hadjeb

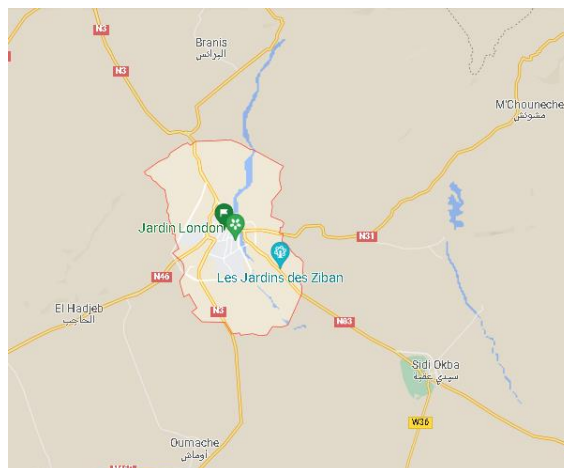


Figure 38 Limits of Biskra

Source: Google Maps

3 Historical development

Pre-colonial period

One thousand three hundred years BC, Biskra was Berber, populated by Ethiopians & Armenians & subsequently by Carthaginians. They relied on it to bring agricultural products for which it was famous.

Roman Period

Biskra went through several brutal wars at that period, counting the enormous resistance led by Takfarinas against the Roman army. With the help of the population, he destroyed the Numidian region.

Thermal architecture hit its golden age with the Romans.



Figure 39 Roman Ruins

Source: Author

The Vandals (4th Century)

The population continuously resisted the Vandal conquerors who occupied the North region of the city until the arrival of the Byzantines. The area pursued its bloody conflicts up until the arrival of the Muslims.

The advent of Okba Ben Nafaa (7th Century)

Upon his arrival, the region became under the Arab-Muslim monarchy, and he died after twenty years of conquering.

At the beginning of the 10th Century, the Zybanes were conquered by the Beni Hamad Kings. And by the 12th Century, the Maghreb was split into three divisions, the Zianides, the Hafsid, & the Merimides. Biskra had an unstable period then.



Figure 40 Okba Ben Nafaa Tomb
Source: Author

The Ottoman Era (1541)

Under the leadership of Hocine Agha, they occupied the North of Biskra.

In 1680, over 7000 people died of an epidemic of plague, resulting in the population leaving the city to settle down on scattered groups inside the palm grove.

In the 17th Century, Biskra was characterized by a geographical centrality of the seven villages. The layers of the villages are linear & compact, following the paths of the Seguia. The Ksourian Vernacular Architecture used local materials.

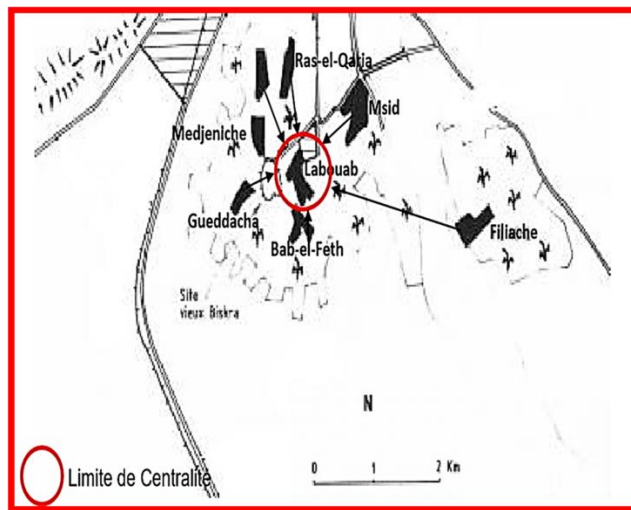


Figure 41 The centrality of the seven villages
Source: FARHI Abdallah (2002) Biskra : de l'oasis à la ville saharienne

3.1 French colonization

They established a new city in a grid pattern in the North, at the Ottoman occupation in the 16th Century & the successive extensions.

Many battles were organized by the resistant population, such as the battle of M'chounech (1844), Cherif Ahmed Belkacem (1846), the uprising of Ouled Djellal (1847), Seriana (1849), Sadek Belhadj (1858); the most important one was the battle of Zaatcha in 1849 led by Cheikh Bouziane.

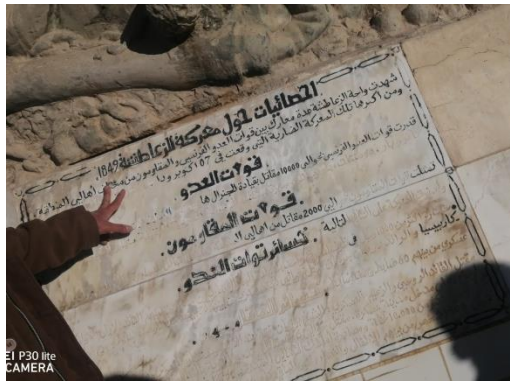


Figure 42 Site of The Battle of Zaatcha
Source: Authors

Saint Germain Fort

The colonists settled down in the old Ottoman fort in the North to gain control of the waters.

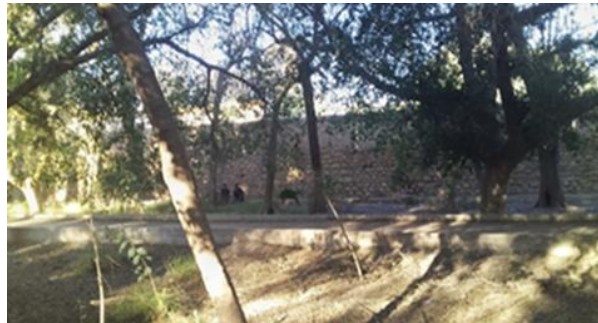


Figure 43 Saint-Germain fort
Source: Authors

First extensions (1893-1950)

Before the realization of the grid, & with the help of the military, the local population built south of the fort a village called “Ras El Ma” according to the rules required by the military service.

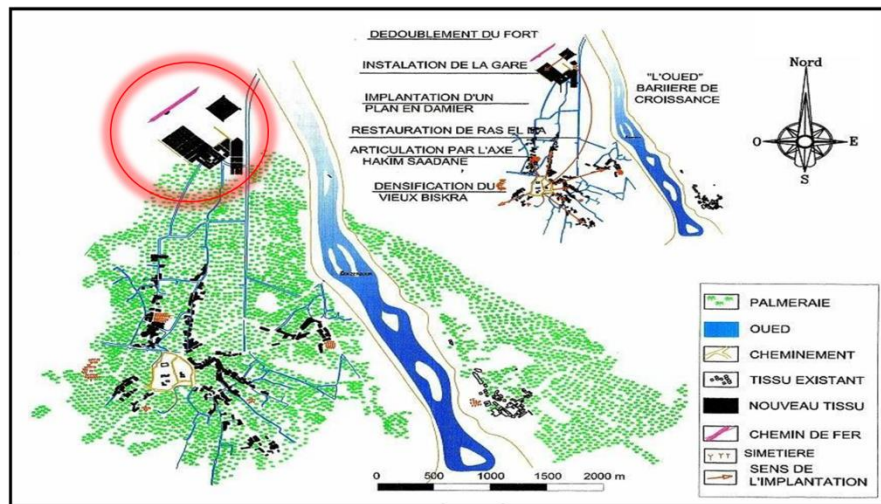


Figure 44 Map of Biskra 1863-1950
Source: FARHI Abdallah (2002) Biskra : de l'oasis à la ville

Colonial Grid

A set of islets arranged in a chessboard frame in the direction of the ramparts of Saint-Germain Fort.

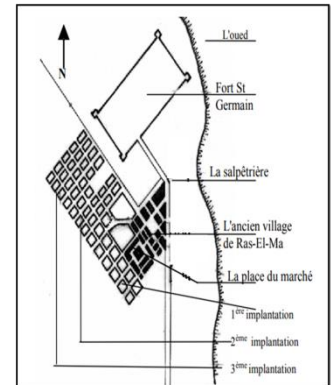
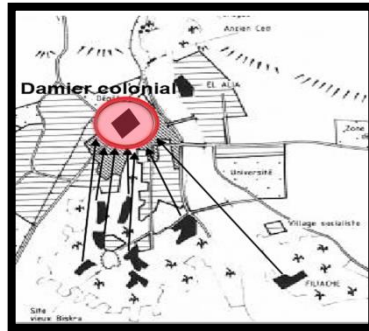


Figure 45 Colonial Grid

Source: FARHI Abdallah (2002) Biskra : de l'oasis à la ville

Second extensions (1950-1995)

Brought a first-dimensional variation of the islets with the continuity of the grid, giving birth to a new type of housing integrated into the gardens of the palm grove.

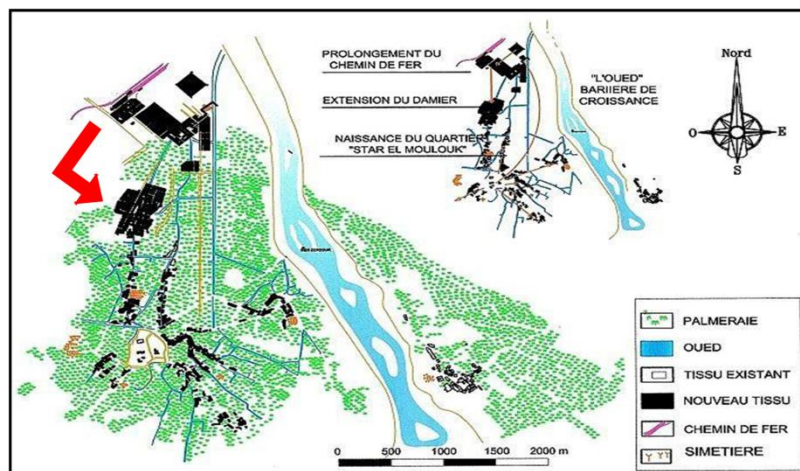


Figure 46 Biskra 1950-1959

Source FARHI Abdallah (2002) Biskra : de l'oasis à la ville

Constantine Plan

French authorities elaborated a new urban plan that consists of realizing a program of social housing & others of emergency nature to integrate into the local population.

3.2 Postcolonial period

1962-1977

Development of the city without any urban organization towards the railway on the West & the palm grove on the South.

An emergence of illicit neighborhoods in El Alia, East of Oued Zerzour.

In 1969, floods submerged the city, provoking a radical change in the social practices; new rural occupants were attracted by work opportunities & services. Traditional building materials were abandoned in favor of concrete.

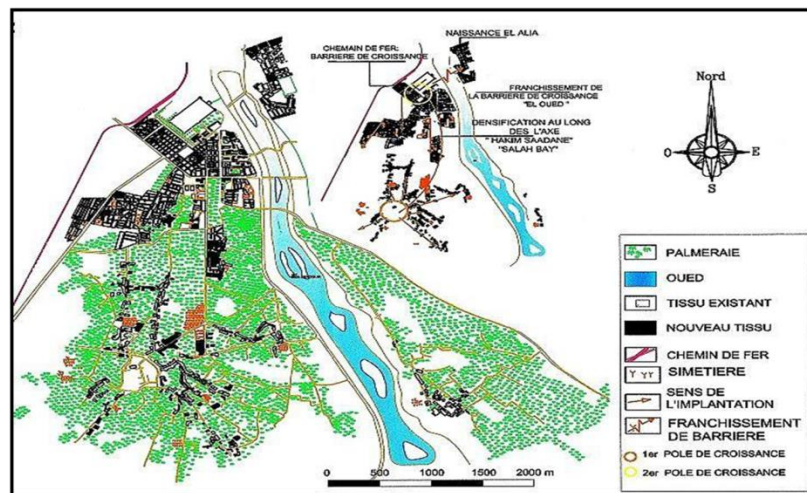


Figure 47 Biskra 1962-1977

Source FARHI Abdallah (2002) Biskra : de l'oasis à la ville

1977-1998

The first urban instruments' appearance answered the population's needs through a new method of construction established by the Algerian government, "ZHUN" West & East. Massive consumption of the palm grove lands & establishment of many pieces of equipment.

West ZHUN: Biskra's extension on El Alia.

East ZHUN: Created in 1977, dictated by the extension needs & the growth of Biskra.

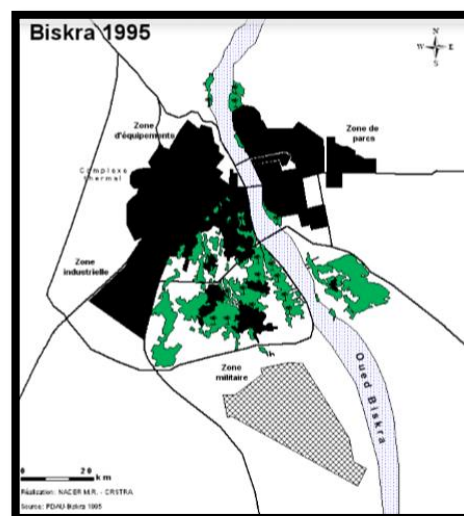


Figure 48 Biskra 1977-1998

Source: FARHI Abdallah (2002) Biskra : de l'oasis à la ville

1998- until today

Biskra continued to grow on both West & East, reaching the neighboring municipalities: Chetma & El Hadjeb and expanding the downtown side towards North & South.

Creation of two new urban poles on the city's Westside to answer the population's needs.

Deterioration of the palm groves & neglected K'sours.

The old Biskra lost the seven villages centrality; most of them are dilapidated except "Gueddacha" village.

Beginning of some rehabilitation & restoration work of the tangible heritage such as Sidi Moussa Mosque in El M'sid.



Figure 49 Biskra 2019
Source: Google Earth

4 Physical data

Climate

Considering Biskra's situation between two distinct climate zones & the semi-desert characteristics of the region engendering in a city with a rigorous climate characterized with a dry & hot summer and a cold winter²⁹.

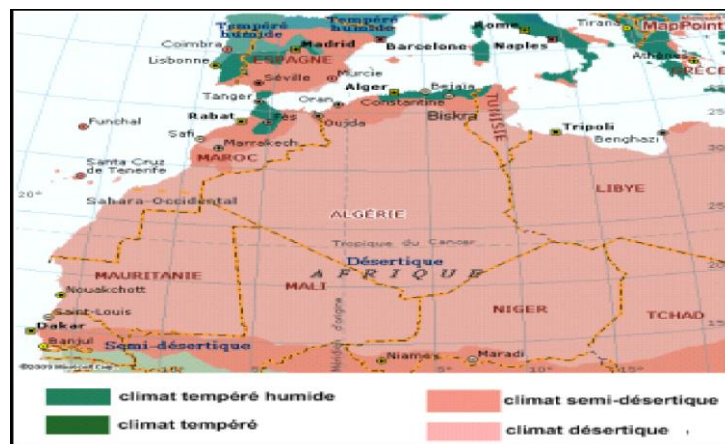


Figure 50 Climatic Map of Biskra
Source: Encarta 2008

²⁹ DAKHIA AZZEDINE, 2019

Characteristics of the climate

Temperature

Significant seasonal variation between 0°C & 49°C with an annual temperature gap of 20°C.

Tableau 1 Average monthly temperatures- Biskra 2006 Source : Biskra's monography

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
T _{max} °	9.9	12	17.7	23.2	28.4	31.6	34.4	33.8	27.3	24.6	16.9	13

Humidity

The average relative humidity is low; it's around 47%, with a value of 90% in December & 10% in July.

Tableau 2 Average monthly humidity- Biskra 2006 Source: Biskra's monography

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
H _{max} %	60	62	44	36	34	29	28	29	41	41	59	65

The Sun

The sun is very intense in Biskra; the hours of sunshine in the hot periods is over 12H a day & 7H in the winter. Thus a problem of overheating is to be seen in the summer.

Tableau 3 Annual sunshine in Biskra Source: O.N.M 2016

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Sun H	243	200	276	266	310	342	369	369	73	262	228	184

Year	2011	2012	2013	2014	2015	2016
Sun H	3240	3309	3250	3112	3312	3322

Wind

Winds are hot and are usually accompanied by swirls of sand & dust.

Tableau 4 Wind Speed Biskra 2006 Source: Biskra's monography

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Wind Speed	4.2	4.2	5.6	5.1	4.3	5.3	4	4.2	4.2	3.4	3.2	3.9

Precipitations

Rare and are mostly rainstorms.

Tableau 5 Precipitations- Biskra 2006 Source: Biskra's monography

Month	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Precip.	53.7	29	1	13.5	11.5	0.2	0	0.7	16.2	9	28.4	9.8

Topography

Geological data

Biskra forms a progressive transition zone between two fields: the Saharan Atlas & the Sahara. This situation provides a particular geomorphological identity. The region consists of divers geomorphological elements:

- ✓ Mountains: 1942m altitude
- ✓ Highlands: Tolga, Ouled djellal
- ✓ Lowland: El Outaya, Sidi Okba
- ✓ Depressions
- ✓ Quaternary: established in the depression regions (dunes)
- ✓ Tertiary: set in the South-West & North
- ✓ Pliocene: Sandy clay
- ✓ Miocene: Clay, sand, gravel
- ✓ Eocene M: Grey clay, gypsum
- ✓ Eocene I: Chalky limestone
- ✓ Chotte Melghir: a salty lake of around 6700 m²; it's the biggest lake in Algeria, situated at 35m under sea level because of an intense evaporation

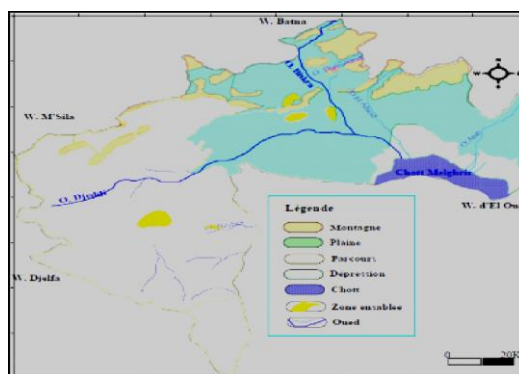


Figure 51 Map of the physical data of Biskra
Source: Biskra's monography

Groundwater

It's Oued waters that control the groundwater; according to the reports of the Biskra water resources master plan (ANAT 2003), there are three types of groundwater in Biskra:

- ✓ Quarternary groundwater: covert part of the plains, with a depth of 3.2 m & are very salty
- ✓ The terminal complex: depth of 300-400m, in piedmont (North)
- ✓ Intercalar continental groundwater: between 1900-2500m depth, very high temperature (50°C)
- ✓ The Maastrichtian aquifer: in mountainous areas where a large quantity of water is transformed to strengthen the drinking water supply

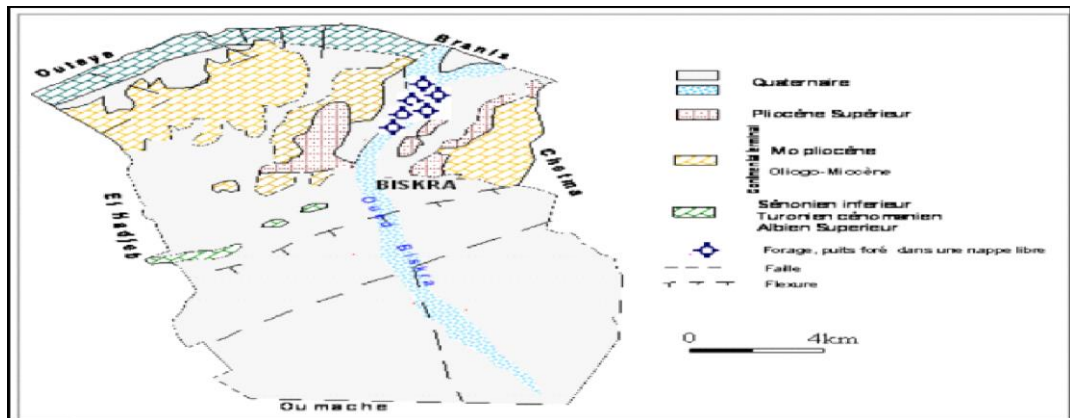


Figure 54 hydraulic map of Biskra

Source: Sedrati 2011

5 Boulevard Mohamed Seddik Ben Yahia

Biskra started its first extensions post-independence after being promoted as the capital of the Wilaya in 1974. The first instruments were The New Urban Habitat Zones (ZHUN). The town got two extensions, one on the East & the other one on the West. The West ZHUN was structured around Boulevard Mohamed Seddik Ben Yahia. It connects the national road N°46 on the South to the urban artery that serves the thermal complex Hammam Salihin.



Figure 55 Boulevard Mohammed Seddik Ben Yahia, Linear centrality of the West ZHUN of Biskra

Source: Author

The malfunction of this urban model was extensively criticized from the infrastructure challenges inherent to the management failure and the inadequate adaptation of the Saharan environment based on the oasian logic: a limited viable territory, very fragile & vulnerable. The succession of equipment & restructuration operations tends to “humanize” the built frame. The population densification seems to have strengthened this process. The planning & architecture directorate has recently undertaken an urban improvement project on the Boulevard. The site is ongoing & remains confronted with the vicissitudes of the context of the SARS Covid-19 & the funding arrangements.

The physical support of the Boulevard remains interesting & could be subject to additional revitalization operations. The urban amelioration insists on the safety of the physical frame. The demographic momentum ended up creating the conditions of a new reality. The urban context went from a peripheral boulevard structured by the Mechanical logic to an urban space with pedestrian dominance. It created the conditions of population reinforcement, from its socio-economic demands and the new needs in distractions & leisure activities.

In this perspective, we proposed a socio-cultural revalorization project of the Boulevard through a certain number of activities & equipment. The aim is to reinforce the meeting & exchange places, to offer a particular frame for the socio-cultural activities, even commercial under a new vision that valorizes the social & cultural spécifities & the zybanese cultural heritage.

One of the major concerns is of this theme is to offer economic sustainability of the social & cultural activities through the support of the territorial collectivities on the one hand, & the use of delivery approaches aiming at sustaining the autonomy of the activities supposed to live only through public subsidies & grants on the other.

Urban context

The site is characterized with collective housing mainly, semi-collective & individual housing comes second. It is primarily marked by a residential function contributing to the environmental aspect. The ground floors are characterized by business & services; essential elements to take care of to offer a dynamic to the central space of the Boulevard.

The total area of the Boulevard is around 5H, divided into different parts punctuated in the middle by a central place. This provision offers the possibility of developing a sequence of four nodes highlighted by cue elements.³⁰

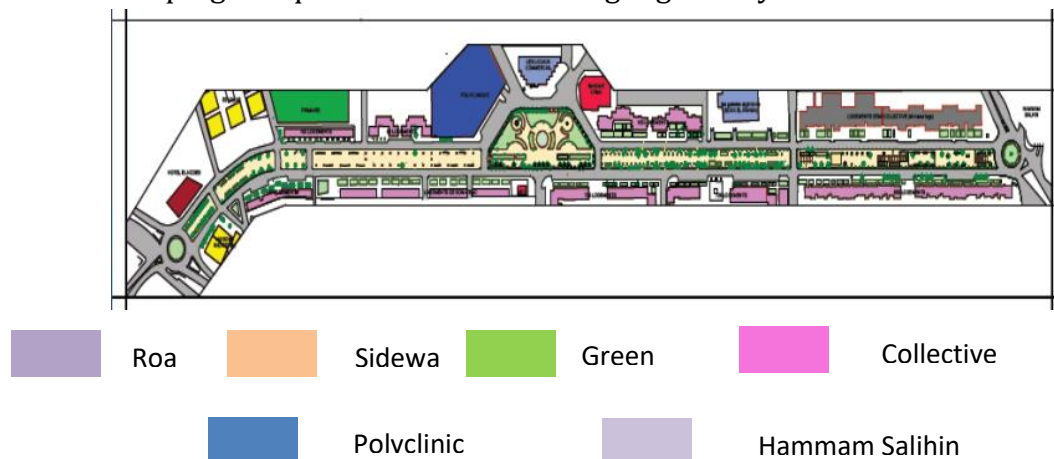


Figure 56 Urban environment of the boulevard Source: urban diagnosis of Boulevard Mohamed Seddik Ben Yahia, Mrs. Faiza Alloui

³⁰ : urban diagnosis of Boulevard Mohamed Seddik Ben Yahia, Mrs. Faiza Alloui

6 Hammam Salihin

Hammam salihin thermal station is a rest & treatment space in a natural & serenity context. It is situated at the gates of Biskra at 400Km South-East of Algiers, 115Km of Batna & at 120m of altitude.

The waters are sulfuric, mesothermal, strongly mineral emerging directly from the source, at 4.5 Km of the station with a temperature of 43°. The thermal practices include baths, showers & inhaling. Add to it Physiotherapy techniques & kinesitherapy.



Figure 57 Situation of hammam Salihin
Source: Google Maps, edited by Author

History of the Hammam

The Roman had known multiple Thermal sources in Biskra that they named “Ad Piscinam.”

In the 1900s, French colonialism built an Algerian inspired hammam reserved exclusively for the Europeans

The current thermal complex was built in 1975, at 4.5 Km of the source.

The study was done by the architect Pierre Vigneron & was realized by SEGAC Louardi Chabani company from Batna³¹.



FIG. 47. — II. Salahin : Vue d'ensemble.

Figure 58 old picture of hammam Salihin
Source: Sami Boufassa, *Architecture des établissements thermaux en Algérie durant le XIXe siècle*

³¹ Descriptif report of Hammam Salihin

Spatial organization

The complex is a compilation of diversified blocks with various activities. They are organized to have the traditional baths as central equipment while the rest is scattered.

Components of the Complex

The complex is composed of the following blocks :

- ✓ The main hotel
- ✓ The thermal bloc
- ✓ The Bungalows
- ✓ The traditional baths
- ✓ A Cinema
- ✓ An old souk
- ✓ Hotel Ennakhil
- ✓ The social hotel

Both the cinema & the old souk are no longer in use & a degraded state.



Figure 59 Components of hammam salihin

Source:: Google Maps, edited by Author

Accessibility

Being primarily a peripheral station, Hammam Salihin was only accessible by car. Hence, both the main entry & the service one are mechanical, but it is still possible to access the station on foot using the main entrance.

The access is done via national road N°3, on the intersection circle of the August 20th Boulevard, 1955 & boulevard Mohamed Seddik Ben Yahia.

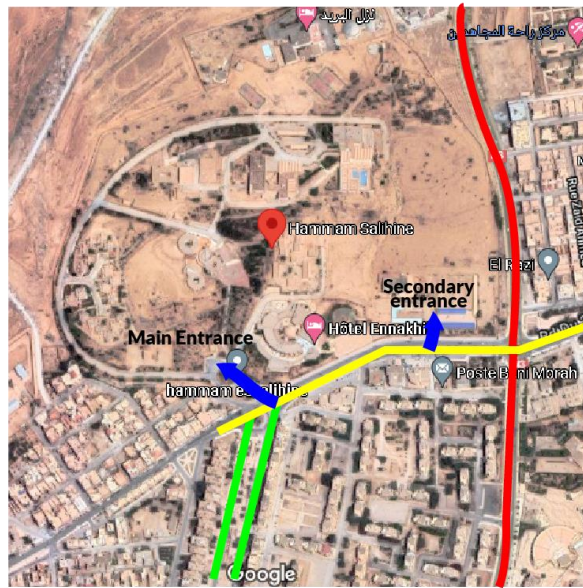


Figure 60 Access to the Complex
Source: Google Maps, edited by the Author

Recommendations

It's essential to keep in mind the growth of the city & the fact that it keeps changing; while the Hammam remains the same, we need to adapt the facility to the changes occurring around it.

We recommend highlighting the pedestrian as principal but keeping the car as a secondary entrance by reinforcing the mechanical circulation as peripheral only & removing the knot by the door, & redeveloping the parking lots to be in harmony with the new peripheral automated logic.

We should also fortify the gate with new equipment that serves as both necessary equipment & a path leading to the center of the Hammam. The center of the Hammam should be developed into making it the heart of the station, giving it more pertinence.

It's recommended to make some changes to the entry by proposing an architectural project, serving as a link between the Boulevard & the Hammam. A retreat should be considered to free the entrance & transform the sidewalk into a small square proposing a stroll from the Boulevard to the yard leading eventually to the station entrance.

4. Site Selection

The Hammam was initially situated at the city's outskirts, making its primary circulation mechanism. The complex was landscaped with mechanical logic with a traffic circle as an entrance directing to the various activities inside.

Today, the city is catching up with the complex, creating a dense environment & giving the pedestrians primary importance. Forcing the reconsideration of the existing logic situated by the end of the Boulevard.

Connection to the Boulevard

The project is destined for local people & tourists. The rupture between the Boulevard & the Hammam created a void, a lack of activities around that area. The renewal of the continuity will allow the people to appreciate the walk from & to the Hammam.



Figure 61 connection to the Boulevard
Source: Google Maps, edited by Author

Structure diagram

Situated at the end of the Boulevard Mohamed Seddik Ben Yahia in the West ZHUN of Biskra. We notice two structuring axis, the national road N°3 & the August 20th boulevard limiting the intervention site.

The end of the Boulevard Mohammed Seddik Ben Yahia marks an urban rupture influencing the consistency of the city's urban plan.

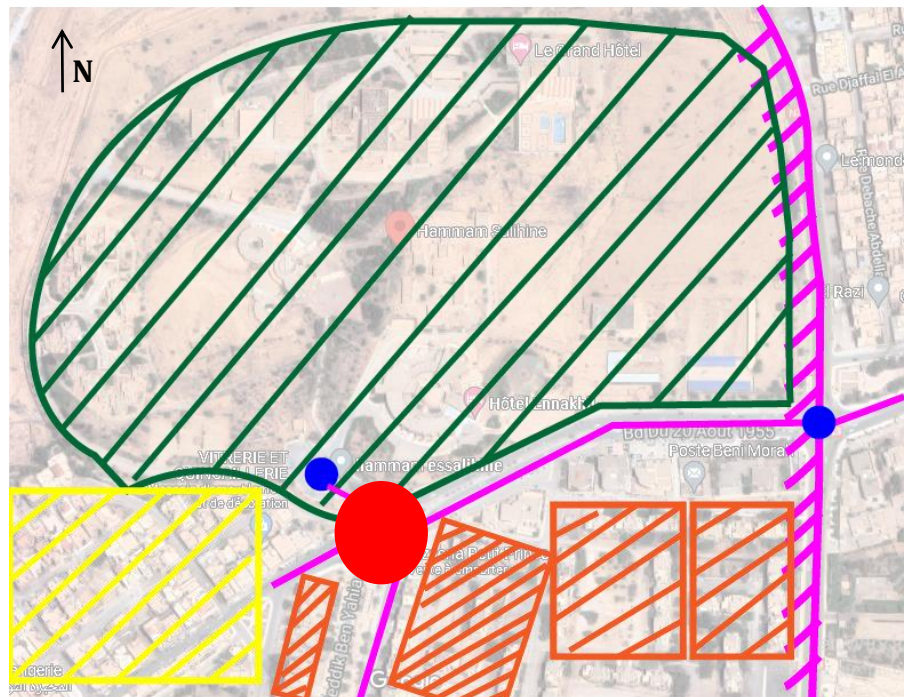
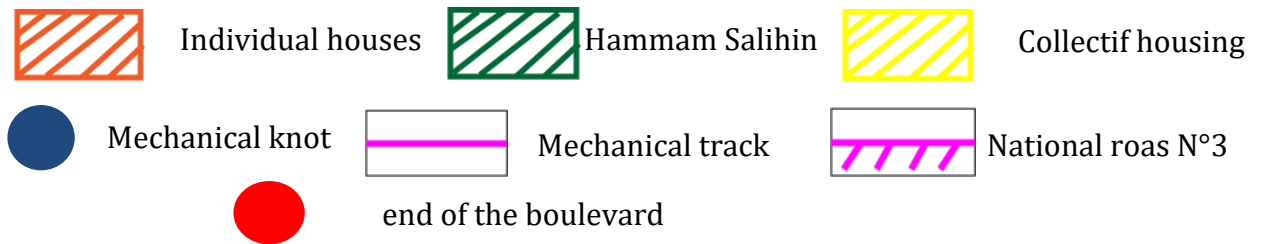


Figure 62 Structure diagram of the existing
Source: Author

Project concepts

Based on the urban & theoretical study, we came up with some indications & foundations that would allow us to explain & justify the urban project. Thus, by an urban intervention on the Hammam & its surroundings.

Autonomy:

It's about integrating the project into the urban plan to ensure a specific identity and independence, making it easily recognizable with the strategic placement of the project.

Hierarchy:

Imposed as an order element that allows the transition from one space to another without confusing the spatial order.

Continuity:

It's about the additional elements composing the urban plan, canceling the rupture between the Boulevard & the Hammam.

Action diagram

To answer the research problem & after reading the structure diagram & the analysis of the urbanism instruments of Biskra, we can propose a diagram of objectives presenting the stakes that would allow us to start the urban intervention explaining the different development actions.

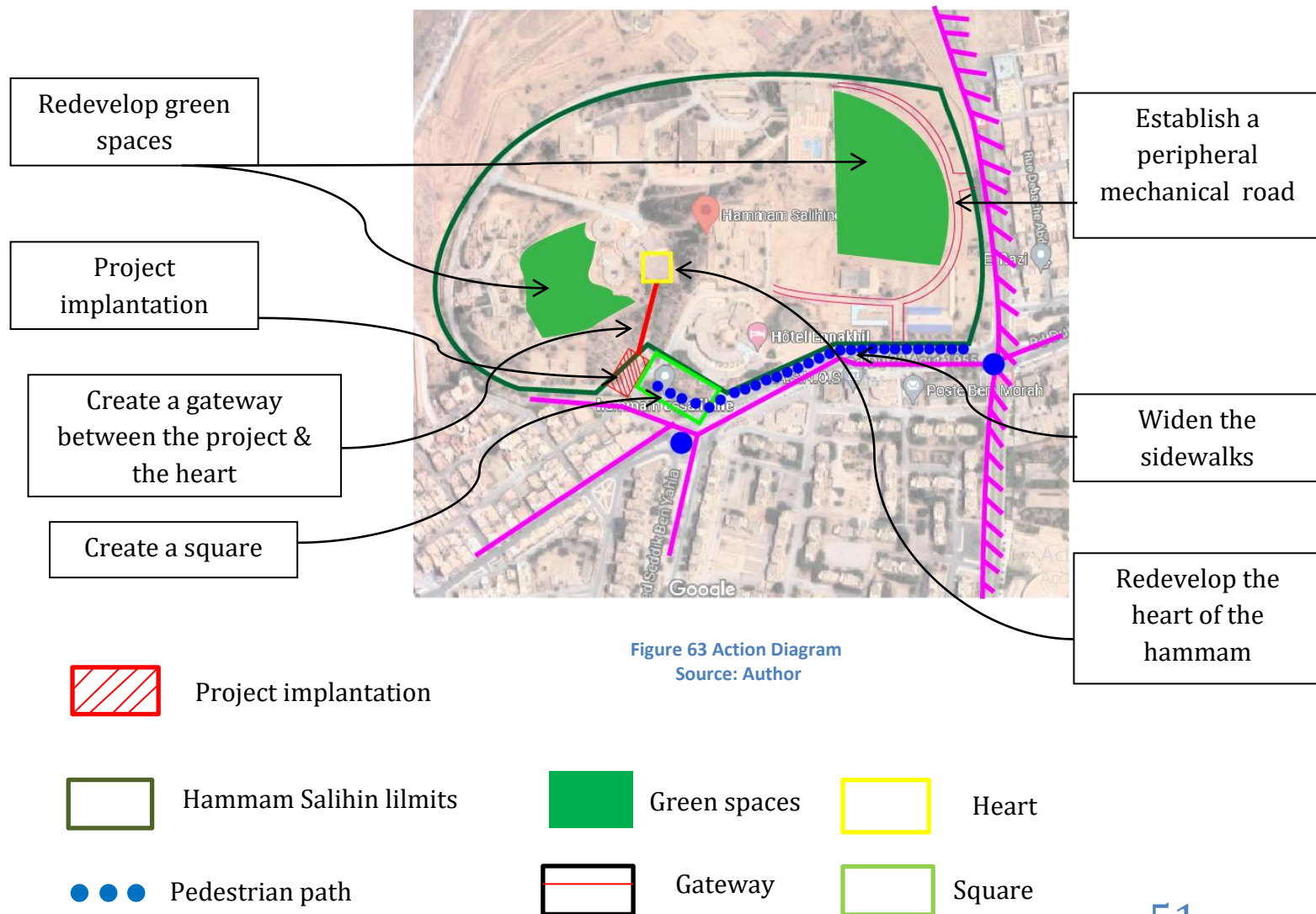


Figure 63 Action Diagram
Source: Author

Widen the sidewalks & redevelop them

Allowing people to enjoy & relax during their walks in the area

Create a central square

We chose to transform the main entry into a square, giving people the chance to spend quality time with their families & enjoy it.

The location of the architectural project

This automatically puts the project by the square, linking the outside & the inside. Thus, making the entry mainly pedestrian.

Establishing a peripheral mechanical road

It was important to make a side entry, by creating a new entrance on the east side by the national road N°3, allowing access to all hammam's equipments, without disturbing its harmony.

Create a foot bridge between the project & the center on the Hammam

A bridge leading directly from the project to the center where they can move around freely.

Redevelop the center of the Hammam

This would result in keeping the connexion, and becoming the heart of the Hammam.

5. Foundations

Foundations	Urban	Architectural	Programmatic	Athmosphere
New spatial order	-New mechanical roads -Secondary entries -new entrance logic	-new equipment by the entrance -small square	-an equipment for reception orientation -services & prestations -social activities, meetings, -Commercial activities	-urban furniture -natural light -playgrounds -green space -designed square
Openness within the boulevard	-Pedestrian routes -peripheral mechanical roads	-monument marked by hight	-square -Services -social activities	-family atmosphere -connection to the boulevard
Suitable vegetal cover	-general plan of the vegetal cover			-Cleaner air, -pleasant walks
Stroll connecting the exterior to the interior	-traffic route for pedestrians		-sport -playground -trade	

Modern equipment by the entrance		-Organize the transition with the end of the Boulevard -	-services -commercial trade -restaurants -traditional stores -pharmacy	-Family & kids space
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Organization plan

Following the rupture between the Boulevard and the thermal station, and to add diversity & architectural richness, we proposed some modifications on the urban scale.

The concept is to improve the attractiveness of the station & its surroundings & preserve the connection to the Boulevard to ensure that the architectural project organizes the transition with the end of the Boulevard to attract more tourists & even locals and ensure their needs to be entertained, to be accommodated, & to return to the nature when needed.

The first intervention was to transform the sidewalk by the entrance into a small square & design it in a way to highlight the area aligned with the Boulevard, to enhance the bond between them. It is essential to widen the sidewalks around the station, allowing people to enjoy their walk, & attract them to the square leading to the entrance

The main goal of this research is to go from the mechanical logic into the pedestrian one. To do that, we must make changes to the entrance, remove the knot & transform the entry to mainly pedestrian & keep the mechanical as secondary on the periphery of the station only & the rest is exclusively pedestrian.

The architectural project by the entrance will be a link between the outside & the inside, allowing people to have the possibility to stroll in a pleasant environment, in green spaces, whether on the inside or outside of the station.

6 Presentation of the intervention site

The intervention site is situated by the mechanical entrance of the station; it's an irregular form of an area of around 1250m².

A low slope characterizes the site.



Figure 64 Situation of the intervention site
Source: Google maps, edited by Author

Delimitation

North: the traditional baths.

South: Boulevard Mohammed Seddik Ben Yahia.

East: Ennakhil hotel.

West: Parking.

Justification

The site offers significant potential to answer our problem. The intervention is by the entrance to realize the changes from mechanical to pedestrian logic & also it's the one area in direct connection to the Boulevard, so it's essential to consider that.

Stages of the development of the project

Qualitative program

For good project development, we will define a qualitative program introducing a functional flow chart of the principal spaces & their requirements.

Functional flow chart

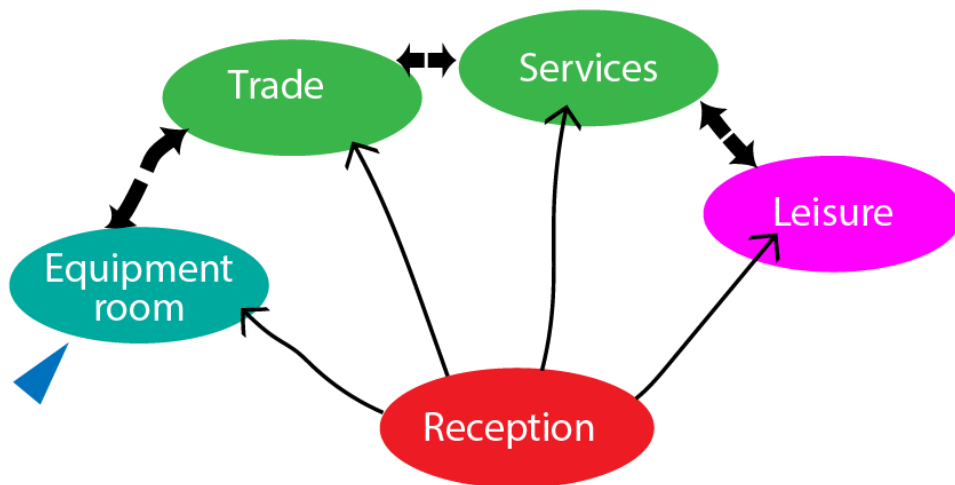


Figure 65 Functional flow chart of the ground floor
Source: Author



Figure 66 Functional flow chart of the first-floor
Source: Author

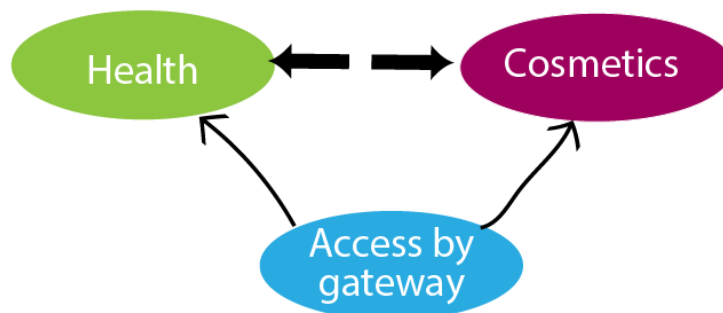


Figure 67 Functional flowchart of the second floor
Source: Author

Spatial flow chart

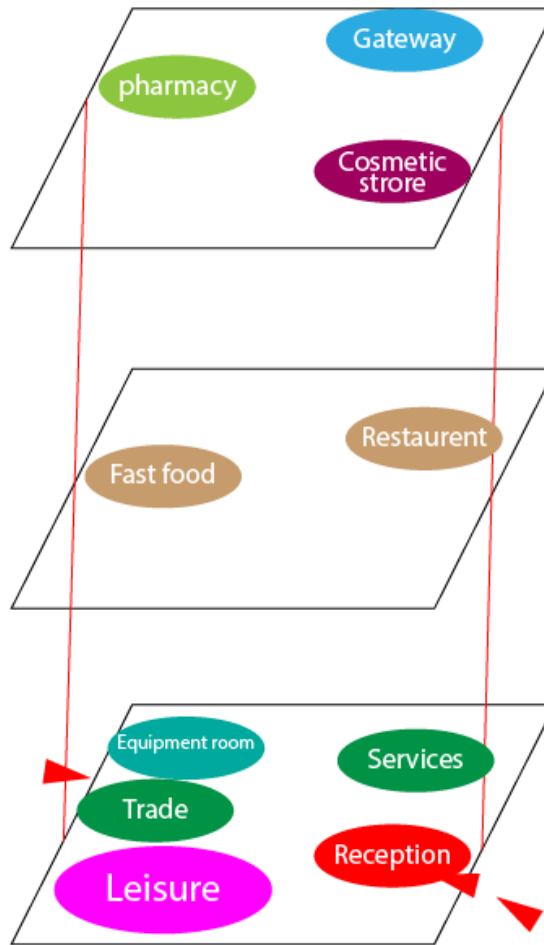


Figure 68 Spatial flow Chart of the project
Source: Author

The project has three floors:

Ground floor

The ground floor is divided into two spaces, open space & reception developed for families & kids play & the other area is dedicated for stores & services, creating the first gallery for clients to pass by. The staircase is situated by the start of the gallery allowing a nice view on the floor while going up or down. The stairs being on both sides generates a sort of gate showcasing the access to the stores

First floor

The access by the stairs overlooks the patio created for relaxation & leisure. The floor is dedicated to culinary activities, restaurants & other food-related activities. The terrace offers a particular view on the floor below and a panoramic view of the city.

Second floor

It's the last floor of the project, and it's composed of a series of Hammam & health-related stores, cosmetics, a pharmacy ...

The last floor has a view of the open space of the ground floor & the first floor, allowing people passing by to enjoy every moment of walking. This floor gives access to a gateway that goes directly to the heart of the Hammam, creating a pleasant walk surrounded by green space.

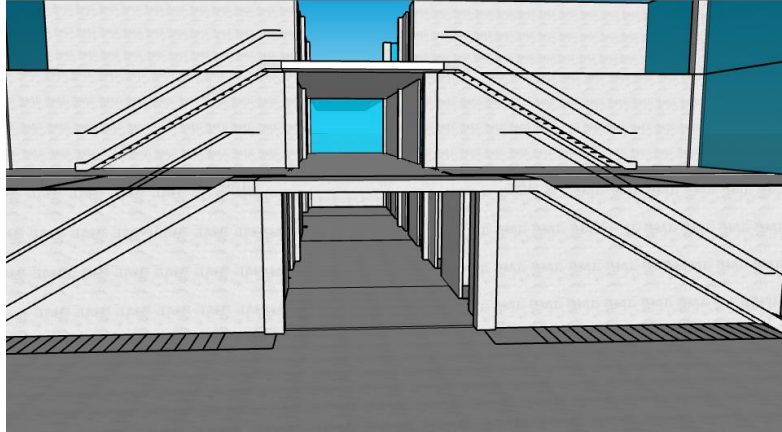


Figure 69 main stairs
Source: Author

Program

Floor	Activity	Surface	
Ground floor	Open space	Reception	25m ²
		Kids playground	100m ²
		Family area	150m ²
	Services & trade	Clothing store	50m ²
		Bathrooms (m/w)	30m ²
		Gift shop	50m ²
		Artisanal shop	50m ²
		Accessory shop	50m ²
		Shoe store	50m ²
		Equipment room	30m ²
First floor	Culinary activities	Restaurant	200m ²
		Fast food	100m ²
Second floor	Health	Pharmacy	25m ²
	Cosmetics	Beauty products	50m ²
		Hammam products	50m ²

The conceptual approach of the project

Project idea

The study and research allowed us to come up with a series of ideas & recommendations to guide us to answer the elaborate our project, based on the following point:

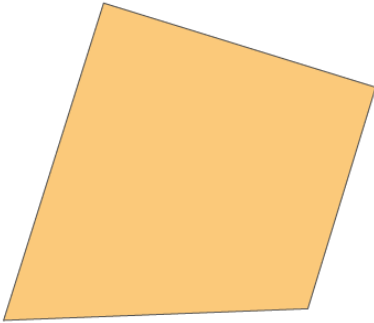
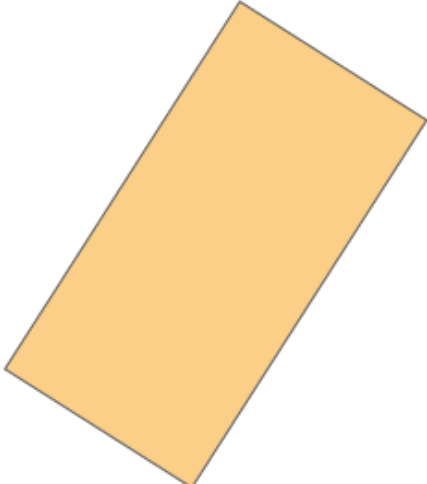
Simplicity: simple rectangular form,

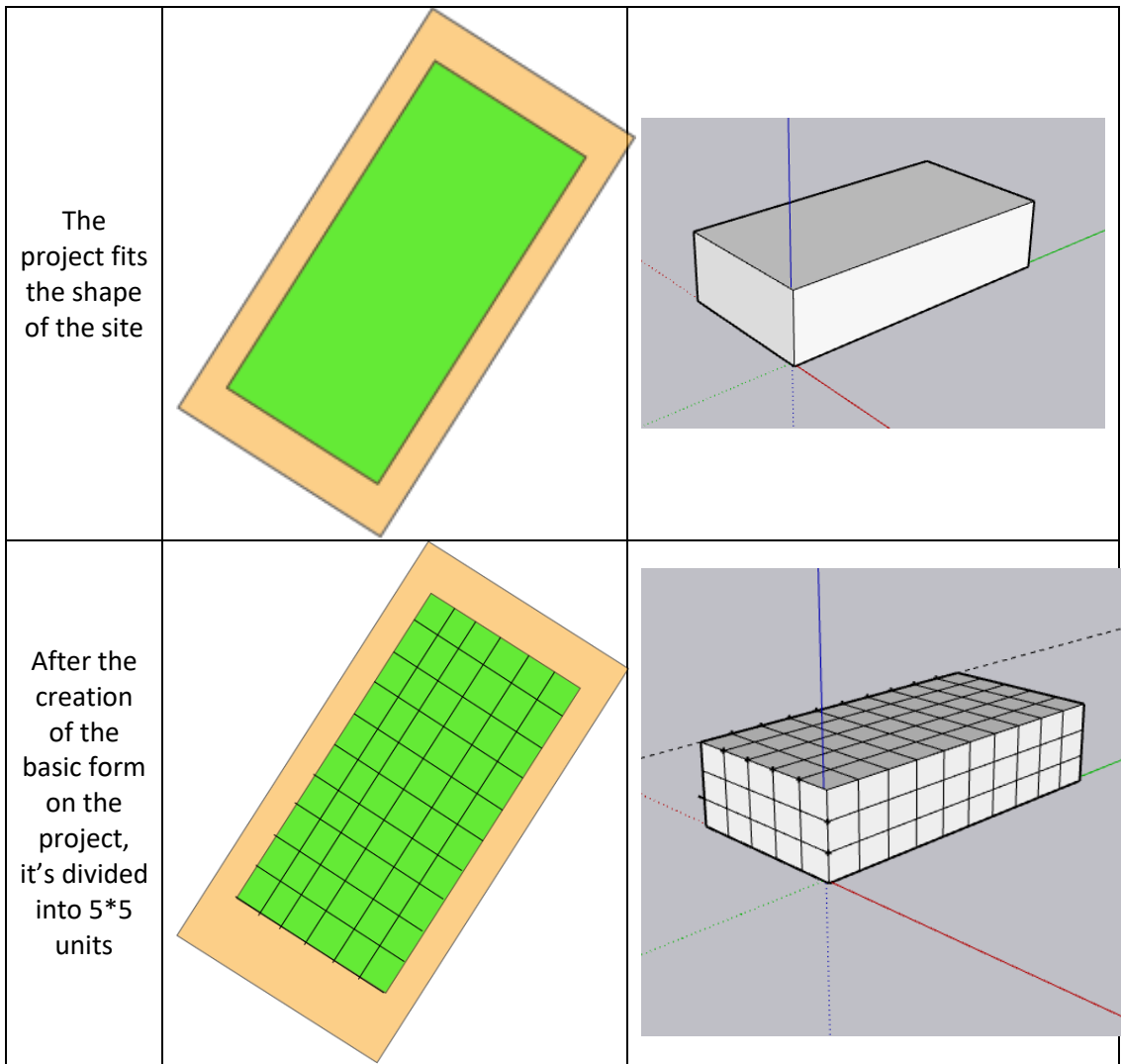
Transparency: the use of semi-emissive glass allowing maximum hours of light by day & an inside view of the bloc by night.

Gradient: the floors will be in a gradient logic, allowing the upper floors to view the ones below clearly.

Continuity: represents the additionality of the different elements composing the project & proposing a stroll linking the Boulevard to the square to the Hammam.

Geometrical approach

Description	2D view	3D view
The basic form of the project is irregular, open to four facades		
We tried to regulate the site, making it a regular rectangle		



Implantation of the project

The project is implanted at the entrance of the Hammam. It owns four facades which two face the outside of the station & has a main pedestrian entrance & a service entrance on the back.



Figure 70 Ground plan
Source: Author

The conception of the facade

Introduction

A facade is the outer face of a building or a set of faces that one sees globally along a centered perpendicular axis, with a cardinal position marker of The observer or a situational landmark in the immediate environment. The facade is a criterion in the architectural concept because it has the relationship between spaces, the interior of the frame, and the external environment. Its role does not stop within the habitable rooms or in isolation; it allows us to give a global idea of the primary function of our building and participate in the immediate outdoor and environmental development.

Our conception is mainly based on full transparency using triple-glazing glass to avoid the greenhouse effects. The clarity aims to give the maximum hours of daylight & decrease the use of energy in the building.

The use of glass facades ensures visual contact (mainly at night) with the exterior environment with controllable & movable solar shading panels.

Triple glazing glass

Triple glazing is insulating glazing with three glazings separated by two gas strips. This composition provides high thermal insulation performance.

The solar shading panels

Solar panels are those devices used to absorb the sun's rays and convert them into electricity or heat. Description: A solar panel is a collection of solar (or photovoltaic) cells, generating electricity through the photovoltaic effect.

The panels are used on the four sides of the facades of the project, allowing to let in light. Still, fewer UV lights & at the same time collect the energy to supply the building with solar power & electricity, & hopefully some of the other station buildings.



Figure 71 Solar panels
Source: Author

the external thermal comfort improvement system

Vegetation

Located on the exterior of the equipment, throughout the square to create shade & cool the air. It's about realizing the role of vegetation in enhancing the external thermal comfort for both the thermal comfort of the users & the economy of energy.



Figure 72 The vegetal cover
Source: Author

Constructing system

The structure intervening in the architectural expression will allow the concretization of an idea or indication of the architectural object from the theoretical state to the actual condition. Forming the project's design requires coordination between the structure, the form, and function while ensuring users the stability and solidity of the system.

Structure

The system chosen for the project is a self-stable of columns & beams system. The structure consists of several linear elements (beam poles), and surface elements (slabs) joined together by links. Its role is to ensure the solidity of the structure by transmitting permanent, variable, and accidental loads to the foundations (on the ground).

Metal Seiling

The metal floor, also known as the metal flooring, is a formwork that blends metal and concrete.

The reinforced concrete is poured on a comprehensive metal profile or cold profiled sheet that can take steel trays for this formwork.

The advantages of the collaborating metal floor include: **Its heavy slabs** remain practical and easily transportable: very solid, they can support up to 700 kg of load per square meter.

Its quick and easy installation: it can be used as a classic concrete floor; Its formwork lends itself very well to cutting and can take various forms according to needs.

On the other hand, some disadvantages to use are noted: **The drying time of the concrete is quite long**, so it is necessary to respect 28 days before the first use.

Poor thermal and sound insulation, to be corrected with a suitable coating; a thorough study of the original structure is required before starting, as it represents a load.

Conclusion

By exploring the state of knowledge concerning the research, this chapter has allowed the development of the foundations that will lead to the project design.

We studied the city to arrive to analyze the air of studies and the site of intervention following its foundations and through urban planning of the space at the end of the Boulevard & the entrance of the thermal station, by applying some ecological, architectural & urban notions showing in the used techniques.

The result itself is undoubtedly questionable. Nevertheless, the important thing is to verify that the foundations have indeed been supported in the conceptual process of the project.

General conclusion

Biskra owns many potentials, whether environmental, landscaped, or cultural, making it a space to practice several types of tourism, especially thermal tourism. This notably encourages the exploitation of these areas for the benefit of citizens and attracts tourists.

The town grew primarily throughout time. Its current status is the result of many factors. It has undergone many transformations that have upset the stability of its development.

The territory, local development, and tourist activity have strong interactions. The territory influences the tourist activity according to the resources and directs the actions to develop its development.

The location of the project is context-rich in history. It is in the culmination of the Boulevard Mohammed Seddik Ben Yahia. The Boulevard is one of the most of the city of Biskra, as it contains a set of essential facilities at the level of this region (Hammam spa complex Elsalhin/hotel/ and the public square Ibn Badis), in addition to its strategic location.

This does not mean that he has no shortage of equipment or is well at the level of boulevard development. For this, we have changed the theme of the urban redevelopment of the Boulevard. Commercial activities, despite their importance, are part of the neglected activities in the city of Biskra. So, we participated in the requalification of the Boulevard by establishing a shopping center in the square of the old market, which presents a source of urban anarchy and a spontaneous place.

We can say the intervention to re-establish the harmony between the Hammam & the Boulevard & find the lost connection between the two can enhance the social attractiveness of the area.

Bibliography

Articles

Exploring health tourism, European Travel Commission, UNWTO, p 10.

Sami Boufassa, Architecture des établissements thermaux en Algérie durant le XIXe siècle

Ueli Gyr, the History of Tourism: Structures on the Path to Modernity, 2010

Serena Gianfaldoni, Georgi Tchernev, Uwe Wollina, Maria Grazia Rocca, Massimo Fioranelli, Roberto Gianfaldoni, and Torello Lotti, History of the baths & thermal medicine

Thesis

GUESSOUM FELAH. -GHALMI SIFEDDINE, LA VALORISATION DU TOURISME DE SANTE A TRAVERS UN COMPLEXE THERMAL HAMMAM AMAMRA CAS D'ETUDE KHENCHELA, p 21

Boudjellal Rokia Chekhab Fatma, Le confort thermique dans une station thermal « le cas de hammam Chellala » a Guelma, p 11

HAMZA MEGHZILI, Modèles d'aménagement et d'urbanisation des Zones d'Expansion Touristique de la wilaya de Skikda (Algérie) p 112

FARHI Abdallah (2002) Biskra : de l'oasis à la ville saharienne

ADEL Nihad. BEKHOUCHE Amira, introduction du confort thermique dans un complexe thermal dans la région de Mila, 2016

Administrative & technical documents

Urban diagnosis of Boulevard Mohamed Seddik Ben Yahia, Mrs. Faiza Alloui

Biskra's monography

Official Journal N°11 of the 18 Dou El Hidja 1423 / February 19th, 2003

Maps

Google Maps

Encarta 2005

Websites

<https://theegeeye.com/turkish-baths-a-source-of-healing/>

<https://eprints.qut.edu.au/16804/1/c16804.pdf>

<https://www.wherisyourtoothbrush.com/ottoman-budapest-thermal-baths/>

<https://www.flickr.com/photos/39997856@N03/8577111246/in/photolist-e4VWmo-rqGLq9-e2P1qz-rKBaq7-dRQBWn-qWRKmZ-8tgtGW-bSwWM6-cYVXHb-ddnNZH-rM9h6J-eGWBJ1-dvKSE4-ha75Rn-e4FQKf-tDMJu-pBvG9A-cyLShU-ehR6T8-e3nkbk-bCYdi1-dkf3v6-ecHJGS-e>

<https://www.caldea.com>

[What is Sustainable Architecture - Barker Associates \(barker-associates.co.uk\)](#)

UN Environment, [Global Status Report 2017](#)

[Introduction to tourism | VisitBritain](#)

[Glossary of tourism terms | UNWTO](#)

[tourism noun - Definition, pictures, pronunciation and usage notes | Oxford Advanced Learner's Dictionary at OxfordLearnersDictionaries.com](#)